INDUSTRIAL DIAMOND ABSTRACTS

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DIAMOND MINING AND INDUSTRY

Alluvial diamond returns for May 1958

S African Mines Dept. *Diamond News* etc 1958 Vol 21 (11) pp 41-42 (Aug)

Rough and uncut diamond production in May 1958 for Cape Province : 3,858.25 ct of total value £30,999 (160s 8d per ct) ; Private Estates : 377.25 ct of total value £7,090 (375s 10d per ct) ; Transvaal Province : 16,773.50 ct of total value £48,006 (57s 3d per ct). Thus total production amounted to : 21,009.00 ct of total value £86,095 (82s 1d per ct).

M *C 1.21*

Tanganyika diamond exports

Tanganyika Dept Mines. *Diamond News* etc 1958 Vol 21 (11) p 42 (Aug)

Exports for June 1958 : 73,560 ct of total value £627,768 (170s 8d per ct). Total exports for January to June 1958 : 245,477 ct of total value £2,195,403 (175s 5d per ct). Corresponding exports for June 1957 : 38,395 ct of total value £336,136 (164s 2d per ct). Total exports for Jan to June 1957 : 145,439 ct of total value £1,386,940 (190s 8d per ct). *M* *C 1.22*

End of the diamond boycott ? Ende des Diamanten-Boykotts ?

Anon. *Gold & Silber* 1958 Vol 11 (9) p 33 (Sep) (In German)

According to a communication of the FAZ, the Central Selling Organization of the Diamond Syndicate will now accept orders from German manufacturers on the same terms as for manufacturers of other nationalities, as long as such orders do not clash with the permanent orders from Antwerp, which will receive preference. *A* *C 1.4*

Diamond find in Basutoland

Anon. *Gemmologist* 1958 Vol 27 (326) p 174 (Sep)

A brief report of a diamond find in the Makhotlong area of Basutoland. *W* *C 1.21*

G.E. diamond wheels

Anon. *Mineralogist* 1958 Vol 26 (9) pp 222, 224 (Sep)

Commenting on synthetic diamond grinding wheels, the author predicts the production of gem quality synthetics. *W* *D 8.0*

Diamonds ' emerging from doldrums '

Anon. *Gemmologist* 1958 Vol 27 (326) p 178 (Sep)

A very short survey of the state of the diamond market. *W* *C 1.5*

Diamonds and ' U '

Anon. *SA Min & Engg Journ* 1958 Vol 69 (3419) p 353 (Aug 22)

Comment on the freeing of industrial diamonds from the Embargo List suggests that it is merely the recognition of a *status quo*. *W* *C 1.4*

The exhibition of machines and tools in Philadelphia, USA. Die Ausstellung fuer Fertigungsmittel in Philadelphia, USA

J. S. Spizig. *Industrieblatt* 1958 Vol 58 (8) pp 356-363 (Aug) (In German)

Amongst many drills, lathes, electrical machines, mills, saws, precision tools, and other toolroom machinery, mention is made of an electrolytic grinder which uses a diamond or silicon carbide wheel for machining sintered carbide at a rate of 500 mm/min, or for obtaining a finish of 1 micron roughness at a rate of 150 mm/min with the diamond wheel. 33 illustr.

A *B 14.2 : C 5.0 : C 6.0*

Secret of Yakut diamonds

M. S. Zriakovskii, N. N. Makarov. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1583 (Aug) (Original in Russian)

Book, Gos izd-vo geogr lit-ry, Moscow. 1958, 108 pp. [Not in library of Ind Diamond Inf Bur].

X *C 1.24*

First female discoverer of a diamond deposit

A. Kirichenko. *Neva* 1958 (3) p 211 (Mar) ; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1433 (Aug) (Original in Russian)

X *C 1.2*

Prospecting for original diamond deposits by means of aerial methods

N. V. Kobets, B. V. Komarov. *Izv An SSSR Ser geol* 1958 Vol 23 (2) pp 85-93 (Feb) ; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1583 (Aug) (Original in Russian)

X *C 1.2*

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More on G.E. diamonds

Anon. *Mineralogist* 1958 Vol 26 (9) p 231 (Sep)

The author hopes for synthetic diamonds at 25 cents/ct 'in the not too distant future'.

W *C 2.6*

U.S.S.R.'s expected industrial output

Anon. *Diamond News* etc 1958 Vol 21 (11) p 23 (Aug)

An annual production level of 6,000,000 ct is hoped for by the Russians. *W* *C 1.24*

Diamonds ; the market in capitalist countries

V. V. Andreev. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1287 (Aug) (Original in Russian)

Book, Vneshtorgizdat, Moscow. 1958, 148 pp. [Not in library of Ind Diamond Inf Bur].

X *C 1.5*

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF DIAMOND AND OTHER HARD MATERIALS

A new aspect of research on diamonds

J. F. H. Custers (Diamond Res Lab, Johannesburg). *Diamant* 1958 Vol 1 (5) pp 5-10 (Sep) (In English, French, and Flemish)

The foremost quality of diamond, both in its use as a gem and in its application in industry, is its hardness. This depends on the lattice structure of the carbon atoms in the crystal, and therefore varies with orientation. Dr M. Seal, of Cambridge, recently put forward a theory that the friction of diamond depends on the crystallographic orientation of the direction along which an object is made to slide over a diamond face. On the basis of this symmetry he was then able to explain the anisotropy of the abrasive resistance of diamond by assuming that directions of high friction are also those of high wear. Along high friction directions the developed temperature will be higher, and this will result in a higher degree of graphitization or carbonization of the diamond. In this way, with further research, the octahedral plane should be found to show a lower friction than any other plane in the diamond crystal.

Further evidence supporting the theory that high temperatures may be produced locally in sliding has been given by Scott, who carried out experiments on the wear of diamond sliding on glass.

The colour of diamonds has no importance for industrial users, although it is of significance in pricing gems. The colour can be induced by bombardment with various atomic projectiles, such as electrons, neutrons, gamma rays, et cetera. By heating a crystal at around 450 deg C after it has been bombarded with fast neutrons, one can change the colour from green to different shades of yellow.

The Diamond Res Lab will soon have in operation a high voltage cascade generator for 1.4 million volts with a current of 3 milliamps in the electron beam at this voltage. Other research is being carried out on such subjects as the semi-conductivity of some diamonds, the classification into types I, IIa, IIb, and the diamond as a crystal counter. *A* *B 1*

Optics of anisotropic media

F. I. Fedorov. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1284 (Aug) (Original in Russian)

Book, Izd-vo Akad nauk BSSR, Minsk. 1958, 379 pp. [Not in library of Ind Diamond Inf Bur].

X *C 2.26*

The orientation of diamonds for tools by means of an x-ray image intensifier tube

J. F. H. Custers (Diamond Res Lab, Johannesburg). *ASTE Conf* 1958 Vol 58 Techn Paper (104) 6 pp

Following a brief description of the principles governing the orientation process, the actual process and the equipment used are described. Briefly, the diamond is mounted on a goniometer head, and the x-ray beam, emerging from an x-ray tube and passing through a collimator, is made to strike the crystal. The goniometer is then manipulated to make a cube axis or 2-fold axis of symmetry coincident with the beam. The orientation can be verified by viewing the image intensifier screen which should show a 4- or 2-fold symmetry, respectively. 8 illustr.

W *C 2.5*

A new absorption band in diamond and its likely cause

F. A. Raal (Diamond Res Lab). *Proc Phys Soc* A & B 1958 Vol 71 (5) pp 846-847 (May 1)

The existence of a new absorption band for diamond has been established at approximately 5,500 AU in all pink and mauve diamonds, and in some brown diamonds where a possible pink or mauve colour could be masked. The strength of the band varies and is correlated with colour intensity ; it has no sharp lines and is not temperature dependent. It is believed to be due to a defect in the diamond which gives rise to an electronic energy level in the forbidden gap, the absorption centre of which is a foreign atom impurity. Calculations support the belief that this impurity is Mn. 1 illustr, 3 ref. *W* *C 2.24*

The infra-red spectrum of diamond

M. J. Stephen (Cambridge Univ). *Proc Phys Soc* A & B 1958 Vol 71 (3) pp 485-490 (Mar 1)

The contribution of lattice vibrations to the infra-red spectrum of diamond in the 2 to 6 micron region is calculated from the vibrational frequency distribution where second nearest neighbour central forces are taken into account. It is assumed that this absorption is associated with two-phonon processes arising from second-order terms in the electric moment. Certain general selection rules are determined. Most of the details of the observed spectrum are reproduced in the calculated spectrum. 2 illustr, 5 ref.

W *C 2.4*

Aspects of gemmology at British Association Meeting

Anon. *Gemmologist* 1958 Vol 27 (326) pp 159-161, 173 (Sep)

General article which summarizes the work of Swedish and American scientists in producing industrial diamonds synthetically. Reference is made to diamonds found in meteorites, and also to crystal dislocations.

W *C 2.6*

The four elastic constants of diamond

R. S. Krishnan, V. Chandrasekharan, E. S. Rajagopal (Indian Inst Sci, Bangalore). *Nature* (London) 1958 Vol 182 (4634) pp 518-520 (Aug 23)

Experiments and calculations are described which definitely establish the existence of four elastic constants in diamond. 2 tables. *W* *C 2.22*

Refractive index of synthetic sapphire

I. H. Malitson, F. V. Murphy jun, W. S. Rodney. *Opt Soc Am Journ* 1958 Vol 48 (1) pp 72-73 (Jan)

Letter to the Editor.

A report on the refractive index of a synthetic sapphire prism over practically the whole of its transmission range, *ie* 0.2 to 6 micron. 1 illustr, 2 ref, 2 tables.

W *C 2.26*

Synthetic emerald. III. Synthetischer Smaragd. III
W. F. Eppler. *Dtsch Goldschmiede Ztg* 1958 Vol 56 (6) pp 327-329 (June) (In German)

This article deals with the synthetic emerald produced by Chatham. It has been found that in many ways Chatham's emerald resembles Igmerald, but there are small differences which are discussed here. The colour shading shows peculiarities, and there are unusually formed inclusions, both connected with and independent of the colouring. 15 illustr, to be concluded.
A *C 2.61*

Liquids in precious stones. Fluessigkeiten in Edelsteinen
W. F. Eppler. *Dtsch Goldschmiede Ztg* 1958 Vol 56 (9) pp 489-490 (Sep) (In German)

Inclusions of a liquid, either carbonic acid or mild solutions of various salts in water, are frequent in gems. An inclusion of carbonic acid in sapphire was observed to separate into two gas bubbles when heated to 31 deg C, at which temperature it boiled. With further heating the gas expanded, and with cooling the second bubble decreased until only the original large one remained. Some stones have been known to have inclusions of two unmixed liquids. The example shown is of two tongue-shaped inclusions of carbonic acid and water in a colourless negative crystal along with other inclusions and peculiarities. 4 illustr. *A* *C 2.7*

Some recent Soviet work on crystal physics
R. F. S. Hearman. *Curr Sci* (India) 1958 Vol 27 (1) pp 10-12 (Jan)

A short survey of Russian investigations of crystal physics. 37 ref. *W* *C 2.5*

Microwave absorption in solids
A. Jararaman. *Curr Sci* (India) 1958 Vol 27 (2) pp 41-45 (Feb)

Methods of using microwave absorption techniques in physical investigations are described. In the neutron irradiation of diamond, it was found that the spectrum contained a strong central line at $g = 2.0028$, and a number of weaker satellite lines ascribed to magnetic centres with electronic spin $S = 1$. These lines were not reduced in intensity by heat treatment, and were attributed to a stable defect such as a C_2 molecule.
W *C 2.27*

Intensity of Ural diamond luminescence in x-rays
N. M. Karnaukhov. *Biul TSIIN tsvet met* 1958 (4) pp 3-6 ; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1433 (Aug) (Original in Russian)
X *C 2.4*

Optical methods for the ultrasonic determination of the elastic constants of sapphire
W. G. Mayer, E. A. Hiedemann. *Acoust Soc Am Journ* 1958 Vol 30 (8) pp 756-760 (Aug)

Three optical methods, formerly only used for isotropic media, were applied to find the ultrasonic velocities in sapphire, and the elastic constants were calculated from the results. The elastic moduli were determined from measurements of ultrasonic velocities in different crystallographic directions, and the Young's modulus was plotted as a function of the directions. 4 illustr, 3 tables. *W* *C 2.22*

Hydraulic[?] size of diamonds and their principal accessories
N. V. Razumikhin. *Vest LGU* 1958 Vol 13 (6) pp 132-140 ; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1433 (Aug) (Original in Russian)
X *C 2.2*

X-ray crystal structures
D. McLachlan, jun. *Zeits Metallkunde* 1958 Vol 49 (9) p 499 (Sep) (In German)

Book, McGraw-Hill Book Co Inc, New York, Toronto, London. 1957, 416 pp, illustr. Price : £5 16s 6d (In English).

The book limits its field to that of single crystals. It covers the basic theory of symmetry and the laws of intensity of x-rays, the Patterson and Fourier syntheses, and various mechanical and optical aids and newly developed instruments. [Book not in library of Ind Diamond Inf Bur]. *A* *C 2.4 : C 2.5*

Theory of cohesive energies and energy-band structures of diamond type valence crystals
A. Morita. *Prog Theoret Phys* (Japan) 1958 Vol 19 (5) pp 534-540 (May)

The SLCO method is used to develop the theory of the cohesive energies of diamond-type valence crystals. A formula which determines the ionicity of diatomic crystals, *eg* InSb, is presented, and a new method for calculating the energy-band structures of these crystals is shown. 1 illustr, 8 ref. *W* *C 2.5*

Size reduction. Zerkleinern
H. Rumpf. *VDI Zeits* 1958 Vol 100 (28) pp 1383-1385 (Oct 1) (In German)

In the first section of the article, headed 'The theory and physics of fracture', mention is made of the Smekal experiments, in which highly brittle materials, including diamond, reveal evidences of microplasticity. 31 illustr.
A *D 7.0*

Synthetic gemstones. III
R. Webster. *Gemmologist* 1958 Vol 27 (326) pp 170-173 (Sep)

Refers to the optical properties of synthetic stones, other than diamond. 4 illustr, to be cont.
W *C 2.61*

The precise measurement of colour in brilliants. Die exakte Messung der Brillantfarbe
K. Schlossmacher. *Gold & Silber* 1958 Vol 11 (9) pp 25-26 (Sep) (In German)

The value of a diamond decreases as it becomes more yellow, so that if a top Wesselton is valued at 100, then a Cape stone is worth only 50 to 65%. Thus the different colorimeters which have been invented are of great importance. The first was produced by the Gemological Institute of America, in which the brilliant under test was measured against a glass prism. Since then the Institute has developed the electronic colorimeter, in which a light ray passes through the brilliant, is taken up in a photoelectric cell, and there produces an electric current which can be read on a measuring instrument. Today the Shipley diamond colorimeter is in use with a method developed from the American model. 1 illustr. *A* *D 9.2 : D 15.2*

Fabulit—the new diamond substitute. Fabulit—der neue Diamant-Ersatz
K. Schlossmacher. *Dtsch Uhrmacher Zeits* 1958 Vol 62 (9) pp 423 (Sep) (In German)

Strontium titanate is being produced by the American Nat Lead Co under the name Fabulit. The optical properties of this material are close to those of diamond. *A* *C 12.0*

LITERATURE REQUESTS
Please quote the page number of the Bibliography containing the original reference, and the author and title of the article, in all cases.

Properties and applications of high alumina ceramics in industry

F. E. V. Spencer, D. Turner. *Inst Prod Engs Journ* 1958 Vol 37 (9) pp 548-559, 567 (Sep)

Paper to the Inst of Prodn Engs, Leicester, Mar 13, 1958.

The article describes the physical properties, production, forming, and machining of high alumina ceramics. Machining operations prior to sintering are performed with carbide tools, but, once sintered, greater accuracy can be achieved only by diamond grinding. Diamond grinding facilitates tolerances of ±0.0001 in., and can be performed on conventional centreless grinding machines employing either diamond-impregnated bakelite wheels or diamond-impregnated steel disks. 17 illustr. *W* *C 12.9*

Model for solute diffusion in crystals with the diamond structure

R. A. Swalin. *Journ Appl Phys* 1958 Vol 29 (4) pp 670-674 (Apr)

A theory for solute diffusion in crystals with the diamond structure, *eg* germanium, is derived and compared with experimental results. Agreement is quite good. 20 refs, 2 tables. *W* *C 2.5*

Anomalous g-shifts of excited states of Cr^{3+} in ruby

I. Tsujikawa, S. Sugano. *Phys Soc Japan Journ* 1958 Vol 13 (2) p 220 (Feb)

In explaining the Zeeman effect of the characteristic doublets R_1, and R_2 of ruby, observed at 83 deg K by H. Lehmann, it had previously been found that the theoretical results contradicted Lehmann's observations in quantitative aspects only. Work is described which removes the anomalies observed at that time, but which shows the *ge*//-shifts of the excited states of R_1 and R_2 to be anomalous. 1 illustr, 5 ref.
W *C 2.5*

Tungsten-carbide coating with a 98 Rockwell A hardness

Walmet Corp, 29900 John R, Madison Heights, Detroit, Mich. *Machinery* (NY) 1958 Vol 65 (1) p 164 (Sep)

Spra-Carb is a coating material of tungsten carbide particles bonded with nickel, chromium, and boron. A working surface hardness of 98 Rockwell A is claimed, and it can be machined with a hard grade of tungsten carbide. Diamond grinding is required for the production of very fine finishes.
W *C 12.21*

USP 2,829,262 (Jan 26, 1953) **E. A. Hamacher, North American Philips Co Inc**

X-ray apparatus

The apparatus is intended for determining the orientation of flat specimen single crystals. The crystal is rapidly oscillated through a wide angular range while a primary beam of x-ray radiation impinges on one flat surface of the crystal. The diffracted beam of radiation emerging from the crystal is detected. By adjusting the mean angular position of the crystal and reversing the polarity of the indication of the diffracted beam until the indication of the average intensity is reduced to zero, a rapid indication of the orientation is obtained. A special collimator is arranged in the path of the primary beam having a wide portion of high absorption and a narrow portion of low absorption. This collimator causes the diffracted beam of radiation to be spread over a wider angular range, and to be concentrated at the correct angle for proper detection. This reduces the likelihood of error. (13 claims, 8 illustr). Ref cited : 6 USP.
J *C2.01 : D 15.01*

S African P 1782/57 (June 5, 1957) **R. W. Ditchburn, P. T. Wedepohl, C. D. Clark, Industrial Distributors (1946) Ltd**

A method of altering the properties of type IIb diamonds

Claim 1 : A method of altering the properties of a type IIb diamond consisting in increasing the number of donor centres in the stone.

Claim 2 : The method claimed in Claim 1 for improving the colour of the diamond in which the number of donor centres is increased to a sufficient extent to bring about the required amount of reduction in absorption towards the red end of the visible spectrum.
W *C 2.01*

S African P 2672/57 (Aug 17, 1957) **J. van Tilburg**

Process for the manufacture of diamond from graphite

Claim 1 : Process for the manufacture of diamond from graphite, characterized in that a target containing graphite is transformed, wholly or partly, into diamond by means of the high pressures generated directly or indirectly by the explosion of an explosive.

Claim 2 : Process according to Claim 1, characterized in that the explosive has the form of a shaped charge provided with a liner, and that the jet coming into being at the detonation of this shaped charge is directed onto the target containing the graphite.
W *C 2.01*

DIAMOND, ETC, IN INSTRUMENTS

Cool jewel outshines tube and transistor

Anon. *Machine Design* 1958 Vol 30 (18) pp 6, 8 (Sep 4)

Synthetic rubies are being used in a new amplifier called a ruby maser. It will have some application in television transmission, and is shortly to be used in an 85 ft radio telescope. *W* *D 15.3*

BP 799,497 **H. Fernández-Morán** (Sep 4, 1954—conv date, Sweden)

Improvements in or relating to cutting machines

The machine is intended as an ultra-microtome for the preparation of sections of thicknesses down to 0.01 micron or less. The microtome as shown in perspective view, Fig 1, has two bearing blocks 6 with finely polished plates 8 forming a V-shaped bearing for a rotor 9. Plates 8 may consist of bronze, glass, hard metal, or diamond. A mandrel 17 is arranged radially in rotor 9 carrying the workpiece to be cut as shown at

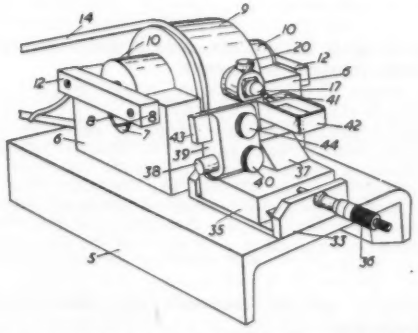


Fig 1. Perspective view of the microtome. BP 799,497.

18, Fig 2. Mandrel 17 is fixed to hollow bolt 16 provided with an electric heating coil 25. The cutting

tool, a diamond, is arranged on slide 35 in extension 41 of trough 42 which contains a liquid (water and alcohol, glycerine, oil) on the surface of which the sections obtained are collected. The feed of the workpiece is effected by thermal expansion of bolt 16 within a temperature between 0 and 400 deg C; refrigeration may be used by filling dry ice, liquid hydrogen, or liquid helium into bore 21 to cool the assembly down to -250 deg C (for cutting materials liquid at normal temperature), and allowing the temperature slowly to rise in a room kept at -15 deg Centigrade. The

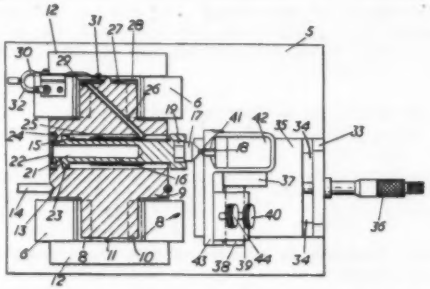


Fig 2. Detailed set-up of the microtome. BP 799,497.

exchangeable bolt is to be selected according to the type of sections desired, and may be invarnickel steel, quartz, or glass. The rotor speed may vary between the normal 50 to 100 and up to 100,000 rev/minute. The cutting diamond should have a weight of 0.2 to 0.5 ct, with a cutting edge of about 2.5 to 3.5 mm, and a cutting angle of 60° (for soft materials) to 80° (for hard materials). For obtaining particularly good cutting edges of 0.001 to 0.01 micron thickness, final polishing with an ultra-fine diamond powder of a mesh size of 0.002 to 0.005 micron is suggested. It is possible to cut 1,000 to 5,000 sections in 15 to 20 min. (12 claims, 2 illustr).

J *C 3.01*

BP 799,498 **H. Fernández-Morán**

(Sep 4, 1954—conv date, Sweden)

Method of polishing a cutting edge of a diamond for a cutting tool

The method refers to a diamond for a microtome as described in BP 799,497. The diamond is held at a fixed angle to a disk rotated at such a speed that surface irregularities are burned off by frictional effects. The polishing medium is a diamond powder of a mesh size between 0.002 and 0.005 micron obtained by centrifuging at about 60,000 rev/min, and mixed to a paste with liquid. The horizontal polishing disk is rotated at between 10,000 and 400,000 rev/min, usually 20,000 to 40,000, the spindle being held between a combination of V-shaped bearings and a pointed end on a supporting (diamond) plate. This arrangement prevents vibration. (4 claims, 2 illustr).

J *C 3.01*

HARDNESS AND WEAR TESTING

Improving the wear resistance of bearing seats in bodies of mining machines

D. S. Balan & coll. *Mashinostroitel* 1958 (6) p 19; *DSIR Transl Contents Lists Russ Period* 1958 (115) p 72 (Oct) (Original in Russian)

X *C 9.0*

Wear and tear of enamelled surfaces

J. W. G. Pedder. *Met Finish Journ* 1958 Vol 4 (43) pp 259-268 (July)

Paper to the Annl Conf of the Inst of Vitreous Enamellers, Gleneagles, June 16-18, 1958.

Previously unpublished work on testing the effects of wear and tear on enamelled surfaces is described. The two basic methods used were diamond scratch testing and abrasion by a stream of fine shot. The diamond block apparatus already in use in the industry was considered to be unsatisfactory, and a new tester was designed which provided uniform testing conditions. A South African battle-axe edged diamond was used, the 120° cutting edge of which was ground in line with the cleavage plane. The apparatus caused the diamond to be lowered on to and raised from the specimen for each test, yet no harmful effects on the diamond edge could be observed. Test results are given.

The blade-shaped diamond is considered preferable to the pyramidal diamond for tests of this nature. 6 illustr, 14 ref, 6 tables. *W* *C 4.0*

The coefficients of friction and wear

P. Sen. *Nuov Cim* 1958 Vol 9 (4) pp 721-730 (Aug 16)

The combination of the R. H. Savage surface energy and the F. P. Bowden and D. Tabor junction formation mechanisms of production of frictional energy is suggested. Using this combination in conjunction with experiments formulated in terms of a stable state that envelopes the whole field of friction, investigations into the nature of the mechanism which produces frictional energy were carried out. This led to a qualitative and satisfactory agreement with the observed results for the values of the coefficients of friction between solid surfaces, solid surfaces with thin liquid or solid soft metal films, for wear, and for the correlation between friction and wear. The coefficient of wear is defined analogously to the coefficient of friction. 13 ref.

W *C 2.23*

Hardness measuring dial. Haertemessuhren

Anon. *Ind-Anzeig* 1958 Vol 80 (76) pp 7-8 (Sep 23) (In German)

The hardness measuring dial stands between the small load hardness tester, with a load of 0 to 300 kg, and the heavy load tester, 30 to 3,000 kg load. The dial shows the hardness directly on its scale in the conventional units, and, in the case of steels, it also records the tensile strength. Typical ranges of measurement are as follows: 15-80 Rockwell C, Brinell hardness of 50-800, and Vickers hardness of 50-1,000. 3 illustr. *A* *C 4.0*

Vickers-Knoop hardness conversion

L. Emond. *Met Prog* 1958 Vol 74 (3) pp 96-B, 97 (Sep) (In German)

Two methods commonly used for measuring the hardness of microconstituents of very thin metallic specimens are the Vickers method, using a diamond pyramid indenter with a square base, and the Knoop method which employs a diamond pyramid with a rhombus base having the long diagonal 7.11 times as long as the short diagonal. Relationships between Vickers and Knoop readings have been determined and published for Knoop loads of 500 g, where close 1 : 1 ratio exists. Given this conversion, equivalent values can be obtained from tables available. A series of tests has been made to determine the relationship between Vickers and Knoop numbers at lighter loads, *ie* 10, 25, 50, 100 and 200 g, and a data sheet shows the relationships. 3 illustr, 1 data sheet. *W* *C 4.0*

Comparison of hardness equivalents. Vergleiche verschiedener Haertezahlen

Anon. *Technica* 1958 Vol 7 (19) pp 1098-1099 (Sep 12) (In German)

In answer to a question concerning the different hardness testing methods, the article examines and compares the Rockwell, Brinell, and Vickers methods, and explains how the figures are calculated. A semi-automatic optical hardness tester for Vickers testing, which will take various loads, is shown together with other models. 4 illustr, 4 ref. *A* *C 4.0*

A theory of cutting tool wear and cutting oil action

A. Dorinson. *ASLE Trans* 1958 Vol 1 (1) pp 131-138 (Apr); *Battelle Techn Rev-Abstr* 1958 Vol 7 (9) p 623a (No 12438) (Sep)

The initiating step in cutting tool wear is postulated as a temperature-dependent migration of chip metal into the tool. The migrated metal softens the tool, which allows wear particles to adhere to the moving chip and be carried away. The kinetics of these processes are developed quantitatively to yield an expression which explains the Taylor equation in terms of the fundamental parameters of cutting.
X *C 6.0*

TRUING OF GRINDING WHEELS

Dressing and truing grinding wheels. Das Schaerfen und Abrichten von Schleifscheiben

Anon. *Technica* 1958 Vol 7 (20) pp 1151-1156 (Sep 26) (In German)

The different types of truing tool are discussed, preference being given to tools with several small diamonds. Special wedge-shaped truing tools may be used for truing thread grinders, as well as pointed diamond tools. The truing of difficult shapes of wheel is also discussed in detail. (To be concl). 30 illustr.
A *C 5.0*

Truing devices. Les machines à rectifier

Anon. *Machine-Outil Franç* 1958 Vol 23 (135) pp 185-189 (Aug-Sep) (In French)

Several devices are described. One of them is the Malicet & Blin truer for internal truing. It is equipped with Gagematic control and a Sizematic diamond truer. The diamond holder is rigidly fixed and controlled with micro-metric precision. 5 illustr.
A *C 5.0*

Truing and dressing machines. Machines à rectifier et à affuter

J. Berthoud, H. Demarez, A. Hesse, J. Pellissier. *Mécanique* 1958 Vol 42 (115) pp 411-416 (Sep) (In French)

Mécanélec 58 Exhibition. One of the machines described is the Cymatic RA 10.45, which has a minimum advance of about $\frac{1}{4}$ micron; this permits the forming of good surfaces on flexible pieces. An automatic attachment is combined with a counter which releases the diamond truing apparatus after a certain number of operations. 5 illustr.
A *C 5.0*

Crush forming method for tool and cutter grinder or surface grinder

H. J. Gerber. *Machine & Tool Blue Book* 1958 Vol 53 (9) pp 141-143 (Sep)

A simple crush truing method utilizes a drill rod of the desired radius for forming a concave radius on the grinding wheel. 2 illustr. *W* *C 5.0*

Oriented diamonds give maximum performance in formed dressing tools

J. Klipper (Clipper Diamond Tool Co Inc). *ASTE* 1958 Vol 58 Techn Paper (99) 9 pp

The theory of orientating diamonds in formed truing tools is dealt with at some length, and figures are given which show the performance of orientated tools in comparison to conventional ones. Exhaustive tests which were used to obtain these figures are described. The superiority of the orientated stones varied from a factor of 2 to a factor of 10. The importance of the introduction of orientation is not confined to the improvement of the average tool life: it contributes towards a narrowing of the gap between minimum and maximum tool life, thus making tool life more predictable. 19 illustr, 5 ref. *W* *C 5.0*

The oriented vector in diamond dressing tools

H. C. Miller (Super-Cut Inc). *ASTE* 1958 Vol 58 Techn Paper (100) 6 pp

This is basically the same article as that abstracted in *Ind Diamond Abstr* 1958 Vol 15 p A118 (Aug). 5 illustr, 1 table. *W* *C 5.0*

Oriented diamonds in connection with single-point tool applications

J. B. Speirs (Am Coldset Corp). *ASTE Conf* 1958 Vol 58 Techn Paper (92) 4 pp

The effect of wear on the efficiency of a diamond truing tool is considered. The hardness of diamond is discussed, and two orientation methods are briefly mentioned. The bulk of the paper is devoted to the crystallographic structure of diamond. 6 illustr.
W *C 2.5 : C 4.0 : C 5.0*

BP 798,637 **Maschinenfabrik und Eisengiesserei A. Heinen GmbH**

(July 8, 1955—conv date, Germany)

Improvements in or relating to tobacco cutting machines

Planet-wise rotating circular cutters are mounted on a cutter carrier arranged above the outlet mouthpiece. The cutter blades are continuously ground by grinding rollers or by a single grinding wheel provided with a diamond truing device. When using grinding rollers, the presentation of the rollers and their truing device is effected from the same source jointly with the advance of the mouthpiece as the blades are ground away. In the case of a single grinding wheel arranged in the centre of the cutter carrier, it receives its rotary drive and advance independently of the drive of the blades, and is temporarily removed from the circular blades while the truing device is presented to the wheel, moving radially in relation to the wheel. This movement of the grinding wheel is independent of the programme control. (17 claims, 9 illustr).
J *C 5.01 : C 12.01*

USP 2,830,572 (Oct 25, 1955) **R. A. Mahlmeister, Cimatool Corp**

Machine tool

Refers to a feed screw drive, especially for grinding wheel truing units, *eg* for diamond truing of ribbed grinding wheels. Provision is made for feed compensation and adjustment, and for uniform movement and the taking up of lost motion during reversal so that the reciprocating movements of the diamond-point and the traverse movement of the housing carrying the tool are precisely co-ordinated. The nut on the feed screw can move radially while the feed is reversed, so that the slide is stationary until drive in the reverse direction commences. A guiding groove in the housing is angularly adjustable so that the lead obtained through

rotation of the screw can be varied as desired. A friction drag arrangement by spring urged plungers movable with the housing results in a uniform and smooth housing movement. The truing unit is angularly adjustable in relation to the grinding wheel so that the ribs of the wheel obtain a full form while the rib crests are progressively enlarged in diameter. (15 claims, 9 illustr). Ref cited : 7 USP ; 1 BP ; 2 FP.

J *C 5.01*

USP 2,832,329 (Dec 5, 1955) **C. H. Newbould**

Grinding wheel dressing device

The fixture is placed on a magnetic chuck and the diamond then adjusted into the desired position. Fig 3 *a* and *b* show the various positions possible by using

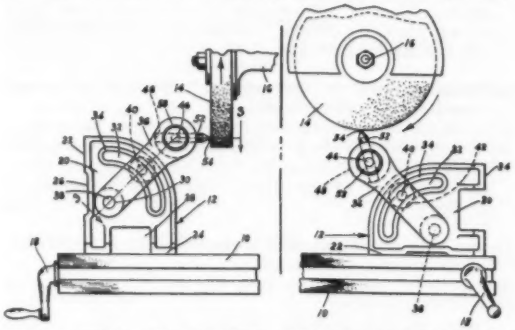


Fig 3 a *and* b. *The positions which can be reached with the device can be seen in these two illustrations. USP 2,832,329.*

either surface 22 or 24 as base, with arm 36 angularly adjustable about axis 38, and tool 52 rotatable in head 48. Tool 58 is set at an angle in head 48 so that its position is approximately in a central plane at right angles through the supporting base. (4 claims, 4 illustr). Ref cited : 3 USP. *J* *C 5.01*

USP 2,832,330 (Aug 9, 1956) **W. J. Hughes**

Grinding wheel dresser

The truing device is intended for accurate profile truing to an exchangeable template with any combination of radii, angles, and/or contours. Fig 4 *a* and *b* show the arrangement of diamond tool 104 on post 100 carrying

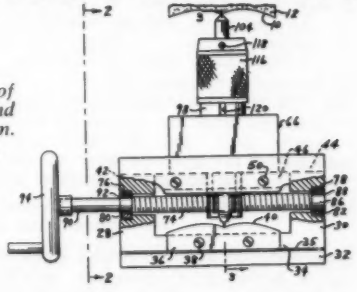
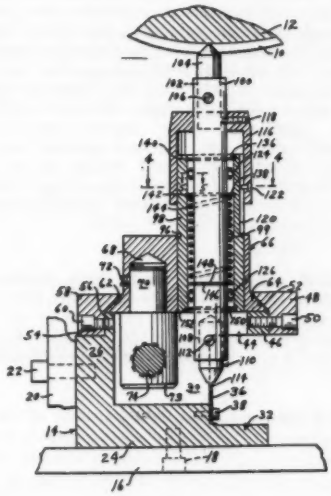


Fig 4a. A view of the truing tool and its mechanism. USP 2,832,330.

follower 110 at its lower end in contact with template 36. Post 100 is guided in sleeve 98 by ball bearings. The upper end is enclosed by cap 116 excluding dirt and grit. Guide pin 122 in slot 120 maintains the radial position of post 100. The structure is mounted on slide 66 on base 14. Slide 66 is moved by hand wheel 94 turning spindle 74. (5 claims, 6 illustr). Ref cited : 4 USP ; *Am Machinist* 1938 *J* *C 5.01*

Fig 4b. A further view of the truing tool. USP 2,832,330.



FINE BORING AND FINE TURNING OF METALS

Present state and future prospects of development in precision machining. Ueber den gegenwaertigen Stand und die Aussichten der Weiterentwicklung in der Feinbearbeitung

H. H. Finkelnburg. *Industrieblatt* 1958 Vol 58 (8) pp 319-327 (Aug 25) (In German)

The term ' precision machining ' is used to cover every type of shape forming, chip producing, or grinding machining method intended to improve the shape, size, and surface in such a way that the surface is comparable to a round workpiece of the ISA quality 7 or finer. Honing, lapping, lapping with an abrasive stream, and eroding are methods described. In the paragraph on the development of machines, under the subject of honing machines, mention is made of diamond honing stones which are reported to have completed 200,000 and even 300,000 borings in one setting. This depends to some extent on the wise choice of cooling oil. 23 illustr, 10 ref. *A* *C 13.0*

Economical milling requirements. Wirtschaftliche Fraesbedingungen

Anon. *Technik & Betrieb* 1958 Vol 10 (9) yellow insert pp 51-52 (Sep) (In German)

The subject is discussed with reference to sintered carbide milling tools ; recommendations are made as to the best speeds for use with different materials, and correct tool geometry. An old-styled miller which cannot run at high speeds will require a width of chamfer roughly equal to the forward thrust at each revolution of the tool. For working cast iron and non-ferrous metals in this way, diamond files are satisfactorily used to true the cutting edges. 5 illustr.

A *C 6.0*

LITERATURE REQUESTS

When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

Ceramic tooling

Alvis Ltd. *Aircraft Prodn* 1958 Vol 20 (7) pp 274-282 (July)

Evaluation tests were carried out on a number of proprietary ceramic tools. The use of ceramic tooling was found to have several advantages over conventional tooling methods, even though the ceramics can not be run to their best advantage at the spindle speeds currently available. The testing procedures are described in detail. It is recommended that sintered oxide tips should be stoned before being put into service. Regrinding of cutting edges is generally carried out with a diamond-impregnated grinding wheel, using a neat-oil coolant. 6 illustr, 4 tables.

W *C 12.9*

Using optical polarization units with motion picture cameras in studying stresses in cutting tool edges

G. S. Andreev. *Vestnik Mash* 1958 Vol 38 (5) pp 54-57 (May); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1494 (Aug) (Original in Russian)

X *C 6.0*

Strength and force relations in the cutting of metals

F. A. Barbashov. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1288 (Aug) (Original in Russian)

Book, Gos nauchno-tekhn izd-vo mashinostroit lit-ry, Moscow. 1958, 43 pp. [Not in library of Ind Diamond Inf Bur]. *X* *C 6.0*

A method of determining forces and moments acting upon a cutting tool

W. Biernawski. *Archiwum Bodowy Maszyn* (PAN) 1956 (1) pp 65-78; *Polish Techn Abstr* 1958 (2) p 79 (Original in Polish)

X *C 6.0*

Research into thread cutting with sintered carbide on a lathe. Erfahrungen beim Gewindeschneiden mit Hartmetall auf der Drehmaschine

E. H. Doerge. *Werkstatt & Betrieb* 1956 Vol 89 (2) pp 91-92; *Techn Zentarlbl*, Abt Maschw 1958 Vol 7 (5) p 838; *Fertigungstechnik* 1958 Vol 8 (10) p 443 (Oct) (In German)

A *C 6.0*

Low-angle x-ray scattering from cold-worked metals

A. Franks. K. Thomas (Nat Phys Lab). *Proc Phys Soc* A & B 1958 Vol 71 (5) pp 861-862 (May 1)

The authors support a double Bragg reflexion mechanism to account for low-angle scattering. 12 refs.

W *C 2.4*

Readjusting positions of cutting tools resulting from their wear

G. P. Grikhno. *Mashinostroitel* 1958 (4) pp 6-10 (Apr); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1494 (Aug) (Original in Russian)

X *C 12.0*

Simultaneous measurement of the forces of friction and of normal pressure on the front edge of a tool

L. F. Kamskov. *Vestnik Mash* 1958 Vol 38 (6) p 52; *DSIR Transl Contents Lists Russ Period 1958* (115) p 110 (Oct) (Original in Russian)

X *C 6.0*

Construction of thread cutters for working heat-resistant steels

A. D. Vershinskava. *Energomashinostroenie* 1958 (7) p 36; *DSIR Transl Contents Lists Russ Period* 1958 (115) p 37 (Oct) (Original in Russian)

X *C 6.0*

New diffusion techniques used for fixing cermet tips to metal shanks

N. F. Kazakov. *Mashinostroitel* 1958 (5) pp 38-40 (May); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1430 (Aug) (Original in Russian)

X *C 12.0*

On a criterion of cutting velocity in metal machining

F. F. Ling, E. Saibel. *ASLE Trans* 1958 Vol 1 (1) pp 124-130 (Apr); *Battelle Techn Rev—Abstr* 1958 Vol 7 (9) p 623a (No 12437) (Sep)

The conventional model of orthogonal cutting with type two chip is modified to include the effect of deformation of the workpiece at the immediate vicinity to the tool tip. The cutting velocity condition for optimal force of deformation is examined in the light of two alternate criteria: recrystallization temperature and melting temperature. *X* *C 12.0*

Laboratory work in the course 'principles of metal cutting and cutting tools'

Z. A. Mashevich. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1290 (Aug) (Original in Russian)

Book, Gos nauchno-tekhn, izd-vo mashinostroit lit-ry, Moscow. 1958, 247 pp. [Not in library of Ind Diamond Inf Bur]. *X* *C 12.0*

Coarse chip machining with sintered carbide. Schwerzerspanung mit Hartmetall

W. Muechler. *Ind Anzeig* 1958 Vol 80 (79) pp 1197-1200 (Oct 3) (In German)

With the development of new extra tough carbides with high heat resistance, coarse chip machining by means of this material has become more prevalent. Details concerning its use and the different forms suitable for different types of work are provided. 14 illustr. *A* *C 12.0*

The new ceramic cutting tools. Les nouveaux outils de coupe en céramique

L. Perrin. *Machine-Outil Franç* 1958 Vol 23 (135) pp 279, 281, 283, 285 (Aug-Sep); (136) pp 119, 121, 123, 125, 127 (Oct) (In French)

In describing the manufacture of these tools, the article devotes some attention to the truing of tools in use. This must be done by diamond wheels with a resin bond. Usually flat truing tools are used with domed wheels. 3 illustr. *A* *C 5.0 : C 12.0*

French drilling machines. V. Precision drilling machines A—horizontal drilling machines. Les machines à aléser françaises. V. Machines à aléser de précision. A Machines à aléser horizontales

G. Rousselle. *Machine-Outil Franc* 1958 Vol 23 (135) pp 303, 305, 307, 309, (Aug-Sep) (In French)

Two machines are described: the De Vallière single spindle drill, and the Diamanta I, by Déragne. Examples are given of work by the first; diamond is used for the finishing operation after carbide rough drilling. 12 illustr. To be cont.

A *C 6.0*

Modernization of metal cutting equipment

Yu. N. Svchev, K. G. Vorob'ev. *Mashinostroitel* 1958 (5) pp 7-12 (May); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1489 (Aug) (Original in Russian)

X *C 6.0*

Mineral-ceramic cutting tools

A. U. Margules. *Stanki i Instr* 1958 Vol 29 (4) pp 39-40 (Apr); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1494 (Aug) (Original in Russian)

X *C 12.0*

Proper grai.. orientation improves diamond cutting tool life

J. Taeyaerts (Precision Diamond Tool Co). *ASTE Conf* 1958 Vol 58 Techn Paper (93) 4 pp

The reasons for orientating diamonds in tools and the physical characteristics of diamond which are considered in the orientation process are discussed. Comparative performance tests for conventional and orientated diamond tools prove that the latter give more than twice the cutting life of the conventional tool. In a typical test, a material was cut at a speed of 550 surface ft/min with a feed of 0.05 in. and a depth of cut of 0.120 inch. The old tool produced 1,930 parts against the 4,131 parts produced by the orientated tool. 9 illustr. *W* *C 6.0*

Thread grinding. Gewinde-Schleifen

F. Zimmermann. *Werkstatt & Betrieb* 1958 Vol 91 (9) pp 551-556 (Sep) (In German)

One of the sections in the article deals with the truing of grinding wheels. It is said that diamond is the usual material used for this purpose, *ie* either industrial diamonds, shaped diamonds, or diamond powder tools. During the process the wheel revolves at grinding speed, or, in America, slightly less, and the truing tool is moved over the edges of the wheel several times. The variations on this basic principle for different-shaped wheels are described. 16 illustr.
A *C 5.0*

USP 2,829,389 **L. A. Sayce**
(Oct 14, 1954—conv date, Gt Britain)

Machine for producing fine pitch screw threads for use in the production of diffraction gratings

The machine is based on the method for producing screw threads of high accuracy and very fine pitch described in BP 684,846 and BP 708,539. The method is characterized by a nut travelling on a highly polished bar on which threads have been cut, and engaging a number of these threads by a soft resilient material thus eliminating small errors when transferring the motion of the nut to a tool cutting a second thread on the bar. A disadvantage of this method is that a great length of material is needed, and that the original thread can be used once only. In the new machine, two cylinders are arranged coaxially, one of which carries the primary thread. The tool for cutting the corrected thread is mounted on a bridge member, one end of which is attached to a nut travelling along the primary thread as described, while the other end is supported in a guide to obtain an exact parallel movement to the axis of the two cylinders. The corrected thread may be cut in metal or in a plastic coating, later to be cut axially and stripped off; or it may be cut into a thin metal (gold) coating on a non-metallic (quartz; glass) cylinder. (6 claims, 5 illustr). Ref cited: 4 USP; 1 BP.
J *C 6.01 : C 10.01*

USP 2,829,516 **P. Chiesorin**
(July 16, 1952—conv date, Italy)

Apparatus for measuring the components of the cutting effort in turning and planing work

The components of a cutting force to be measured in turning and planing are transmitted by metallic membranes arranged in the direction of the forces causing elastic deformations which, in their turn, cause changes of volume in chambers containing mercury. These changes are indicated by the height of columns in vertical tubes of small diameter, almost capillary. The absence of mechanical transmission and the constancy of an indication amplified by a liquid arrangement make the device particularly simple. (7 claims, 2 illustr). Ref cited: 6 USP; 1 BP.
J *D 15.01*

USP 2,831,240 (May 16, 1955) **W. Maurer**

Compound duplex cutting tool bit

At least one cylindrical portion of the body of the bit is curved about an axis at an angle to the axis of the cylindrical portion to impart a second curvature to the edge. The two axes intersect and one curvature is upwardly disposed, the other one downwardly as shown in Fig 5. Two tool edges are formed, 16 for cutting

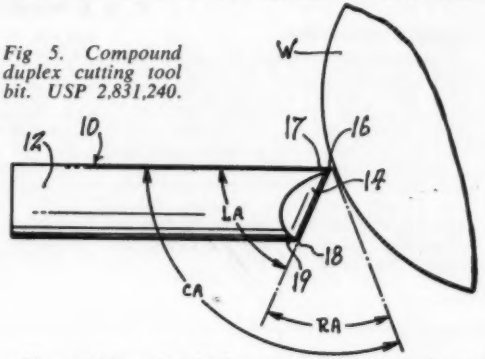


Fig 5. Compound duplex cutting tool bit. USP 2,831,240.

with a positive rake, 18 for cutting with a negative rake (by turning the bit 180°). It is said that such bits permit high speed operation and obtain high finish, while cratering or built-up edge and the necessity of a chip breaker is eliminated. (2 claims, 10 illustr). Ref cited: 3 USP.
J *C 6.01*

CUTTING AND MACHINING OF GLASS

The polishing of glass. V. Compression and plasticity of glass. Das Polieren von Glas. V. Kompression und Plastizitaet von Glas

E. Brueche, K. Peter, H. Poppa. *Glastechn Ber* 1958 Vol 31 (9) pp 341-348 (Sep) (In German)

The problems encountered during experiments, which have not been fully resolved, are listed. Plasticity was demonstrated experimentally with the use of a diamond point and diamond dust only, and not in connexion with other processes. The questions studied particularly in this article are concerned with the recurrence of scratches after polishing, and whether glass plasticity is linked with the water absorption of the glass and whether there exists microplasticity in the sense used by A. Smekal. It is shown that the re-appearance of polishing grooves in the etching process is the effect of deep reaching stresses in the glass under the scratch traces, and that certain cracks during splitting can be put down to the drying out of the surface layers of glass. The experiments lead to the conclusion that F. W. Preston's observations do not hold good for the results obtained concerning the polishing process, and that the microplasticity of glass in the strict Smekal sense is a real phenomenon. 18 illustr, 17 ref.
A *C 7.0*

Relation of thickness of the relief effect and the removed layers in polished glass to abrasive grain sizes

P. Ya. Bokin. *Steklo i keram* 1958 Vol 15 (4) pp 8-10 (Apr); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1458 (Aug) (Original in Russian)
X *C 7.0*

Automatization and mechanization of glass finishing and transportation processes

D. V. Dymshits. *Steklo i keram* 1958 Vol 15 (4) pp 43-44 (Apr); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1458 (Aug) (Original in Russian)

X *C 7.0*

USP 2,830,884 (Apr 5, 1954) **W. D. Smiley, C. H. B. Morrison**

Abrasive composition

A finishing composition for glass (lenses) is produced from a mixture of 50 to 80% (volume) of pumicite and about 20 to 50% of a harder abrasive selected from the class of emery, spheroidized pumicite, silicon carbide, garnet, fused alumina, and quartz, of a particle size of 5 to 50 micron. Both abrasive ingredients may be of a size to pass a 325 mesh screen. The preferred pumicites are the minerals obtained from the formation near Friant, California, a white volcanic glass. The fusing is effected in a gas or electric arc furnace at a temperature of about 300 deg Fahrenheit. (4 claims, 1 illustr). Ref cited : 13 USP. *J* *C 7.01*

MACHINING OF STONE, ETC

Precision machines slice and dice transistor elements

C. Emerson. *Am Machinist* 1958 Vol 102 (18) pp 85-87 (Sep 8)

The fabrication of germanium and other semiconductor elements is described, and the various machining operations are illustrated. The ingot (boule) is mounted on a glass slide, and slices down to 0.020 in. thick are cut from the ingot by a metal wheel loaded with diamond powder. The slices are lapped with an aluminium oxide abrasive in a castile soap-water carrier. At least 0.005 in. stock is removed from each face, and accuracy is within 0.001 inch. Finer polishing stages require an aluminium oxide or diamond abrasive applied by silk- or nylon-covered lapping disks. Wafers which are to be diced are mounted in wax between glass plates as a protection against chipping. Sawing is carried out with diamond loaded wire-mesh saws. Dicing can also be performed ultrasonically. 5 illustr.
W *C 8.6*

Why not ceramic as a material for gages ?

C. G. Erickson (Pratt & Whitney Co Inc). *Machine & Tool Blue Book* 1958 Vol 53 (9) pp 129-131 (Sep)

Both hot and cold pressed ceramics have been used for plug and ring gauges, thread plug gauges, and for various wear applications. Methods of fabrication are explained. On a large cylindrical plug, ¾ in. of material was ground from the outside diameter with only 0.0005 in. diamond wheel wear. Diamond lapping compounds are used in finishing operations, and have produced a flatness of 0.000005 in., with a 4 rms finish. Cylindrical ring gauges are made solid, and the gauging diameters are ground out with resinoid-bonded diamond wheels, followed by lapping. 4 illustr, 1 table.
W *C 12.21 : C 13.2*

Canada's largest circular stone-cutting saw

H. K. Porter Co (Canada) Ltd, Toronto. *Canad Machinery* 1958 Vol 69 (9) p 142 (Sep)

Canada's largest circular stone cutting saw is at present under construction. It is 9 ft in diameter and will weigh half-a-ton. Millar Fast Cut Ltd, North Bay, Ontario, will install 150 diamond teeth in the 11/32 in. thick edge. 1 illustr. *W* *C 8.0*

Semiconductors . . . from crystals to devices

L. L. Friend. *Westinghouse Eng* 1958 Vol 18 (4) pp 116-119 (July)

The complete process of transistor production is described, from the pulling of germanium and silicon crystals to the assembly of the transistor. Slicing is carried out by mounting the boule on a steel rod and fixing it in the chuck of a slicing machine. A diamond saw cuts slices of 0.010 in. thickness, and the boule is advanced automatically after each slice is cut. 10 illustr.
W *C 8.6*

Grinding ceramics by dual method is faster

R. B. McPherson. *Electronics* 1958 Vol 31 (23) p 112 (June 6)

A method is described in which through-feed and infeed are combined to diamond grind alumina or metal out-of-round components. Quick stock removal is assured by the use of 20 in. diameter diamond grinding wheels with 2 in. peripheries. Tapered components can easily be ground. 1 illustr. *W* *C 12.6*

USP 2,831,476 (Apr 9, 1957) **H. A. Wilson, R. W. Frazier, United States of America**

Crystal cutting saw

This is a precision saw for cutting extremely hard and brittle crystals, *eg* of the cadmium sulfide type, for photoconductors, photo-voltaic cells, gamma detectors, and rectifiers. Commercial diamond saws have been found unsatisfactory for this purpose as they tend to split or shatter the crystal. The saw assembly is shown in Fig 6. Crystal 14 is fixed on platform 15 (with 15% beeswax and 85% rosin), and horizontally reciprocated by guide system 12 through eccentric 23 while being slowly lifted by platform 26 on lazy tongs linkage 27. Cutting wire 9 thus cuts through the crystal while held under tension by spring systems 54, 55. The wire is supplied from supply spool 10, threaded over drums 5 and advanced to winding drum 11 driven by a separate motor to spread the wear on the wire. A number of wires may be used to make a number of simultaneous cuts and for cutting crystals of different widths. (11 claims, 4 illustr). *J* *C 8.01*

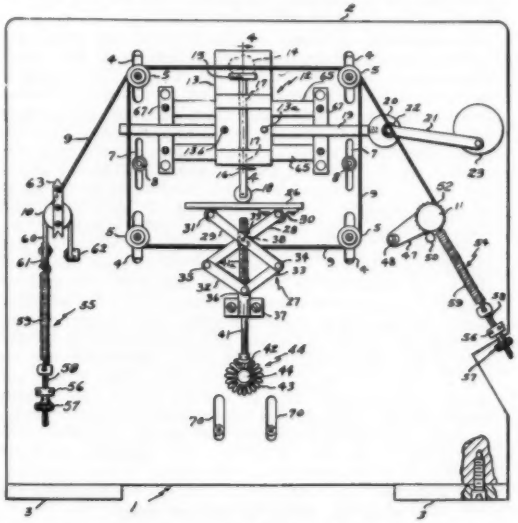


Fig 6. The saw assembly is clearly shown here. USP 2,831,476.

USP 2,831,668 (Jan 14, 1957) **R. F. Skowronski**

Ultrasonic stone cutting device

Stone and rock are cut without any abrasive by a cutting blade reciprocated at 10,000 to 100,000 vibrations/second. A cylindrical hollow body contains a rod of ferromagnetic laminated material (nickel; nickel alloy) which can be axially oscillated in the body. The forward end of the rod projects through a rubber block, and the rearward end rests in a central recess of a rubber block. The projecting end is threaded into the apex of a fanshaped plate with slightly curved and outwardly flared edges (a foot wide and from $\frac{1}{4}$ to $\frac{3}{4}$ in. thick). Narrow web-like plates are welded to the body in the same plane to both sides of blade. An electric coil is arranged around the rod in the body to energize the device by AC, and handles on the body with a trigger serve for switching on the current and for supplying coolant to the blades, which enters and leaves the body through tube connections, and which also assists cavitation by forming with the material cut an abrasive slurry. The tool is suitable for quarrying veneer stone, tunnel and shaft construction, mining, excavating, et cetera. (5 claims, 7 illustr). Ref cited: 4 USP; 1 BP; *Metalworking Prodn* 1956.

J *C 8.01*

GEM POLISHING

USP 2,829,472 (Sep 22, 1953) **A. Salzer**

Automatic diamond cutting and polishing device

The device is intended for the quantity production of properly cut stones by permitting pre-setting to effect the cutting of a number of stones to a predetermined extent without resetting, and further to signal audibly or visibly when the cutting is completed, with automatic removal of the dop from contact with the scaife. Fig 7

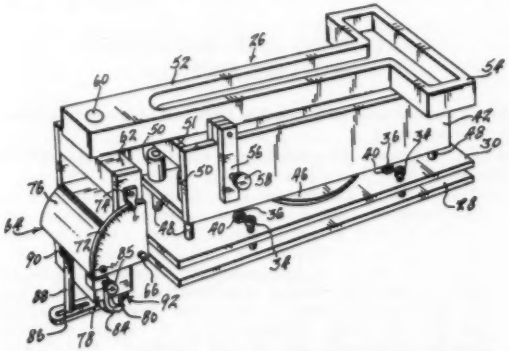


Fig 7. Perspective view of the automatic diamond cutting and polishing device. USP 2,829,472.

is a perspective view of the device showing base plate 28 to be fixed radially in relation to the scaife (not shown) with support plate 30 adjustable at an angle to plate 28 by screws 34, and secured by studs 36. A channeled stand 42, strengthened by cross bar 51, is spaced above plate 28 adjustable toward and away from this plate, but remaining parallel to it independent of the adjustment of the plate 28. The adjustment is effected by hand wheel 46 along guides 48. Tang 52 rests on stand 42 between stops 56. Yoke 62 on pin 60 carries the adjustable dop assembly 64 clamped in position by a wing nut (not shown) when adjusted around axis 66. Hook like arms 84 are adjustable for engaging the stone in the dop held further by a finger 86 on stem 88. A contact assembly 92 serves for signalling the end of cutting and for removing the dop from the stone by means of adjustable curved spring contacts of different widths which close circuits on touching the scaife. (7 claims, 17 illustr). Ref cited: 7 USP.

J *D 4.01*

Swiss P 328,989 (Jan 20, 1955) **R. Farines**

Method for piercing workpieces of very hard dielectric material, in particular of jewels (stones) destined for industrial purposes, and device for carrying out this method. Verfahren zum Lochen von Werkstuecken aus sehr hartem dielektrischem Werkstoff, insbesondere von fuer industrielle Zwecke bestimmten Edelsteinen (Lagersteinen), sowie Vorrichtung zum Ausueben dieses Verfahrens

The workpiece, *eg* a watch jewel, is pierced by an electric spark. The exact position of the hole is determined by a holder of highly insulating material, as shown in Fig 8, consisting of a plate d_2 with a recess

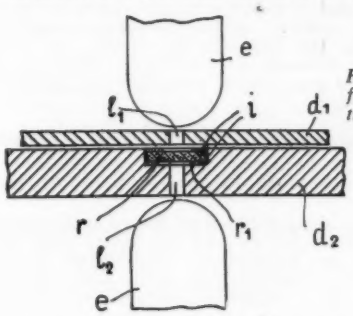


Fig 8. Apparatus for positioning the hole. Swiss P 328,989.

r_1 for the disk jewel r, covered by an insulating plate d_1. Both plates have channels, l_1 and l_2 respectively, for guiding the spark between the electrodes e to the centre of the jewel. The workpieces may be arranged on a turntable, with a number of recesses for jewels to be holed, and fed through the gap between the electrodes. Instead of a turntable, a band conveyor may be used. (9 claims, 3 illustr).

J *D 10.01*

ROCK DRILLING

Method for determining the drilling capacity of small diamond heads

V. I. Morozov. *Razved i okh nedr* 1958 Vol 24 (4) pp 21-23 (Apr); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1406 (Aug) (Original in Russian)

X *C 6.0*

Time marches on! Drilling in Tennessee

Am Zinc Co. *Diamond News* etc 1958 Vol 21 (11) p 22 (Aug)

Exploratory drilling carried out between July 1954 and Oct 1956 consisted of 450,311 ft of hole, all except 487 ft of which was performed with diamond bits. The job was executed without serious interruptions and no holes were lost. Core recovery varied between 90 and 100%, and costs averaged $2.10/foot.

W *C 9.21*

Diamond-bit performance in quartzite

A. J. Rambosek, A. E. Long. *US Bur Mines* 1958 RI 5402, 23 pp

An analytical report is presented on the performance of 681 random-set bits and 207 bits having diamonds orientated in the hard-vector direction when core drilling in quartzite ; the bits drilled a total of 12,460 ft on 44 different projects. Matrix alloys were either beryllium-copper (approx 40 RC), beryllium-nickel (approx 50 RC), or sintered metal powders (approx 35 to 45 RC). Details are given of the selection of diamonds, core barrels, and drills, and of the effects of diamond size and quality, type and size of bits, core recovery, and bit matrices. The following conclusions are drawn : (*i*) diamond loss and bit cost/ft drilled decrease as the number of diamonds/ct is increased from 8 to 20 stones to 20 to 40 or more ; (*ii*) for core-drilling quartzites, the lower grade, cheaper diamonds, such as Congos, are the most economical ; (*iii*) loss of core in excess of 10% adversely affects bit performance ; (*iv*) M-type bits recover higher percentages of core, have in general lower diamond losses, and drill greater footages at a lower cost/ft than bevel-wall bits ; (*v*) diamond losses and bit costs/ft drilled usually increases as the bit size increases ; (*vi*) no definite advantage could be determined for any one type of matrix ; and (*vii*) orientation of diamonds in hard-vector directions in drill bits proved economically advantageous. 22 illustr, 15 ref, 12 tables. *W* *C 9.21*

Diamond-bit performance in cherty limestone and cherty dolomite

G. H. Johnson, A. E. Long. *US Bur Mines* 1958 RI 5403, 23 pp

An analytical report is presented on the performance of 409 random-set bits and 49 bits having diamonds orientated in the hard-vector direction when core drilling in cherty limestone and cherty dolomite ; the bits drilled a total of 14,088 ft on 44 different projects. Matrix alloys were either beryllium-copper (approx 40 RC), beryllium-nickel (approx 50 RC), or sintered metal powders (approx 35 to 45 RC). Details are given of the selection of diamonds, core barrels, and drills, and of the effects of diamond size and quality, type and size of bits, core recovery, and bit matrices. The following conclusions are drawn : (*i*) diamond losses and bit costs/ft drilled decrease as the number of diamonds/ct is increased from 8 to 20 stones/ct to 20 to 30 or more stones/ct ; (*ii*) the lowest quality and cheapest drilling boart—the A-grade—was the most economical ; (*iii*) loss of core adversely affects bit performance ; (*iv*) M bits consistently recover a higher percentage of core than bevel-wall bits ; (*v*) an increase in bit size is generally accompanied by an analogous increase in diamond losses, bit costs/ft drilled, and percentage of core recovered ; (*vi*) no definite economic relationship between bits set with any one type of matrix was established ; and (*vii*) orientated diamond bits are more economical than unorientated or random-set diamond bits. 22 illustr, 12 tables, 12 ref.

W *C 9.21*

Wear of hard alloys by friction with rocks during core drilling in prospecting

E. F. Epshtein. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1288 (Aug) (Original in Russian)

Book, Gos nauchno-tekhn izd-vo neft i gorno toplivnoi lit-ry. 1952, 171 pp. [Not in library of Ind Diamond Inf Bur]. *X* *C 9.0*

LITERATURE REQUESTS

When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

USP 2,829,868 (Aug 14, 1953) **A. F. Pickard, W. W. Svendsen, E. J. Longyear Co**

Wire line core barrel

The core bit attached to the tubular drill stem has a thickened bottom portion with diamonds embedded therein, and is threaded onto a reaming shell with, *eg* diamond-points, on its outer surface. The core sample, as it is cut, enters into the core barrel inner tube assembly. This inner tube assembly fits loosely within the outer tube and is held down by a latch arrangement. The core rises into an inner (core receiving) tube to which a core lifter is attached with a number of ribs on a resilient split steel ring for grasping the core sample. The sample is disengaged from the drill bit by pulling the drill stem upwards, and raised by a wire line with a shearing pin to prevent the line from breaking in case of jamming of the core barrel. (11 claims, 5 illustr). Ref cited : 10 USP.

J *C 9.01*

WIRE DRAWING

The manufacture of Robertson rolling mills and wire drawing machines, etc

Anon. *Brit Machine Tool Engg* 1958 Vol 40 (191) pp 41-72 (Apr-June)

89 illustr. *W* *C 11.0*

Grinding machine for wires. Schleifmaschine fuer Draehte

Anon. *Draht-Welt* 1958 Vol 44 (17/18) p 263 (Sep) (In German)

A *C 11.0*

GRINDING AND POLISHING OF HARD METALS

Some experiences with the No 1900 AB Automet polisher attachment

R. L. Anderson (Westinghouse Electr Co). *AB Metal Digest* 1958 pp 2-11 (July)

The Automet attachment will accommodate five or six metallographic specimens and present them to the lapping plate at pressures variable from 0 to 60 pounds. The variables in lapping, *ie* abrasives, types of cloth, type and amount of lubricant, and pressure, can all be easily controlled. Three attachments are required for the ideal set-up : one for the three stages of grinding, one for the rough polishing with 6 micron diamond lapping compound, and one for finishing. A cloth can be charged with diamond several times, and has been used for up to 200 specimens. The operation of the attachment is described, and photomicrographs illustrate finishes obtained. 12 illustr.

W *C 8.6 : C 13.0*

Dimensions of grinding wheels and segments of grinding wheels

British Standards Inst, 2 Park St, London W 1. *Amendment* No 1, published July 29, 1958, to *BS* 620 : 1954

An amendment to the above British Standard contains four alterations which should be noted by manufacturers. *W* *D 8.0*

Numerically controlled 3-D profilers machine around axis of workpiece

Ex-Cell-O Corp, 1200 Oakman Blvd, Detroit 32, Mich. *Am Machinist* 1958 Vol 102 (18) p 127 (Sep 8)

The grinding assemblies of Numeri-Tool profiling machines consist of a precision grinding spindle, with its drive equipment, and a hydraulically operated swivel-type diamond truer, all mounted on a base. The spindle is mounted on a small slide that provides axial movement, and the truing device bracket is rigidly mounted on the base. An elongated cup-type grinding wheel is trued to a spherical shape of a definite radius, and the radius is maintained throughout the wheel's life. By causing the wheel spindle to move towards the truer and allowing the truer to remain fixed, the position of the grinding wheel in relation to the work remains constant, and the truer has the effect of an automatic sizing device. 2 illustr. *W* *C 5.0*

The economical use of grinding machines in mass production. Wirtschaftlicher Einsatz von Schleifmaschinen in der Reihenfertigung

W. Peter. *Industrieblatt* 1958 Vol 58 (8) pp 327-332 (Aug) (In German)

The subject is discussed using cylindrical grinders as the example from which conclusions are drawn. In all grinding operations, four measurements must be taken into consideration: the diameter, the accuracy of rotation, the cylindrical quality, and the surface finish. Other measurements must be taken according to the work in question. The correct measurements and angles for different types of grinding are described under headings according to the method. In the paragraph on copy grinding, a set-up is described and illustrated in which the angle of the diamond to the wheel profile can be altered as desired. 24 illustr.
A *C 5.0*

Lapping in present day manufacture. Das Laeppen in der neuzeitlichen Fertigung

W. Schmid. *Industrieblatt* 1958 Vol 58 (8) pp 338-341 (Aug) (In German)

The materials which can be lapped range from iron and non-ferrous metals to hard rubber. The materials used for the operation are silicon carbide, electrocorundum, polishing rouge, chromium oxide, boron carbide, and diamond. Lapping pastes contain chromium oxide or diamond, the latter being used to obtain a very high finish on hard materials, *eg* sintered carbide. The lapping compound is usually applied with the addition of oil and petroleum. Different methods of lapping and their correct applications are described, including abrasive jet erosion. 8 illustr, 2 ref.
A *C 13.2*

Tool grinding and lapping machine

Beacon Machine Tools Ltd. Hurst Lane, Tipton, Staffs. *Engineer* 1958 Vol 206 (5355) p 425 (Sep 12)

Two 8 in. diameter wheels, in conjunction with manually oscillated tables, permit the grinding and lapping of carbide tools of up to 2 in. depth of section. Swing over wheel guards permit left- and right-hand tools to be worked. Each wheel operates with a 16 × 8¼ in. table which is adjustable from 10° negative to 30° positive rake. 1 illustr.
W *C 12.0 : C 13.2*

Grinding helical gears

H. J. Pearson. *Aircraft Prodn* 1958 Vol 20 (10) pp 380-393 (Oct)

A description of the Orcutt internal helical gear grinder. The diamond truing mechanism is described at length. 13 illustr. *W* *C 5.0*

Correct maintenance of sintered carbide tools. Hartmetall-Werkzeuge richtig gepflegt!

R. Schmitz. *Industrieblatt* 1958 Vol 58 (8) pp 351-355 (Aug) (In German)

The subjects of the maintenance of sintered carbide tools and their correct use are discussed at length. Diamond wheels, mesh D 70 in synthetic or metal bonds, are recommended, as also are silicon carbide wheels. For fine finish grinding, diamond wheels of a mesh size of D 30, D 15, and D 7 should be applied successively, and the grinding should be dry. The speed should be between 2 and 8 m/sec if boron carbide is used, and from 5 to 10 m/sec if diamond is used. The finish achieved varies between 1 and 4 micron in roughness. For grinding chip breaker steps, special attachments can be used, the best being a diamond cutting disk fixed elastically to the grinding axle. These may be of a bronze bond 100 to 125 mm in diameter, and of D 70 mesh. For the manufacture of rounded ends, special grinding machines are used, or, alternatively, diamond files.

Attempts to use diamond truing tools for truing silicon carbide or aluminium oxide grinding wheels are liable to cause the grains to be cut through, and thus a pressing surface instead of a grinding surface is formed on the wheel. Also excessive heat may be generated and cracks caused.

Although silicon carbide or corundum grinding is always carried out wet, diamond grinding is better dry, especially for fine grinding. A soda-water coolant may be used, and the diamond wheel should be cleaned at frequent intervals with petroleum. 19 illustr.
A *C 12.0*

Machine for lapping spherical ends of piston rods

A. F. Arkhangelskii. *Mashinostroitel* 1958 (5) p 24; *DSIR Transl Contents Lists Russ Period* 1958 (115) p 71 (Oct) (Original in Russian)

X *C 13.2*

For complete single-point tool grinding

Hammond Machinery Builders Inc, 1631 Douglas Ave, Kalamazoo, Mich. *Tooling & Prodn* 1958 Vol 24 (6) p 147 (Sep)

The CBE-66 uses an electrolytic chipbreaker and an oscillating diamond cup wheel; 80 to 90% saving in wheel consumption is reported.
W *C 12.2*

Petrography of synthetic abrasives

N. E. Filonenko, I. V. Lavrov. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1288 (Aug) (Original in Russian)

Book, Gos nauchno-tekhn izd-vo mashinostroit lit-ry, Moscow. 1958, 90 pp. [Not in library of Ind Diamond Inf Bur]. *X* *D 14.1*

Progress in profile grinding. Fortschritte des Profilschleifens

H. Schmidt. *Werkstatt & Betrieb* 1958 Vol 91 (9) pp 533-537 (Sep) (In German)

Owing to the diversity of machining methods and tools available to the manufacturer, more care must be taken in choosing tools and machines which will answer the specific requirements of different operations. This article describes new developments in profile grinding tools and machines, and possibilities opened up by these. Diamonds are mentioned as one of the materials to be used for truing high speed grinding wheels, and frequent truing of diamond grinding wheels used on sintered carbides is recommended. 18 illustr. *A* *C 5.0*

New automatic honing machines. Neue automatische Honmaschinen

G. Haasis. *Industrieblatt* 1958 Vol 58 (8) pp 344-349 (Aug) (In German)

The use of specially constructed diamond tools for certain honing operations is recommended. Diamond grinding is recommended for the rough grinding of tools used in other honing methods. Sintered diamond honing tools are used on the aeronautical honing machines described; these hones can perform 30,000 operations without re-setting. 14 illustr.

A *C 13.3*

Experimental study of polishing with a grinding abrasive

S. M. Kedrov. *Stanki i Instr* 1958 Vol 29 (6) p 22; *DSIR Transl Contents Lists Russ Period* 1958 (115) p 92 (Oct) (Original in Russian)

X *C 15.0*

Grinding threading tools with multiple thread wheels

V. D. Kurochkin & coll. *Mashinostroitel* 1958 (5) p 30; *DSIR Transl Contents Lists Russ Period* 1958 (115) p 71 (Oct) (Original in Russian)

X *C 5.0*

Factors influencing the performance of grinding wheels

E. J. Krabacher. *ASME Prep* 1958 (58-SA-40) 7 pp (June); *Index Aeronaut* 1958 Vol 14 (9) p 65 (Sep)

Results of a research programme on the utilization of grinding wheels which are summarized cover the wheel material, nature and measurement of wheel wear, the significance of the type of grinding operation, effect of mechanical variables on grinding wheel action, chemical wear due to reactions between abrasive grit and the work material, and fundamental research on the mechanics of wheel wear.

X *D 8.0*

Causes of appearance of cracks in grinding and remedial measures

G. L. Levin. *Vestnik Mash* 1958 Vol 38 (6) p 55; *DSIR Transl Contents Lists Russ Period* 1958 (115) p 110 (Oct) (Original in Russian)

X *C 5.0*

Effect of technological factors on the depth of polished hard-faced layers

Yu. S. Terminasov, A. G. Yakhontov. *Metalloved i obr met* 1958 (5) pp 40-43 (May); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1463 (Aug) (Original in Russian)

X *C 6.0*

BP 798,713 **SASIB SpA Scipione Innocenti-Bologna**
(Aug 11, 1955—conv date, Italy)

Leaf tobacco shredding machines

This refers to the automatic adjustment of the distances of the rotary cutter head and its grinding wheel with respect to the tobacco discharge mouthpiece. The knives of the revolving cutter head touch an electric contact when they pass in close proximity to the mouthpiece, and thus automatically control the intermittent feed device of the cutter head. The grinding wheel, whose position is automatically adjusted to compensate the knives' wear, is continuously trued by a diamond arranged above the wheel. The wheel is intermittently rocked upward against the diamond and then back again into the sharpening position. (17 claims, 10 illustr). *J* *C 12.01*

BP 800,680 **National Broach & Machine Co**
(Oct 31, 1955—conv date, USA)

Gear finishing tool

A tool for finishing hardened gears is made of a gear like body in which the teeth are formed of a rigid plastic compound with abrasive particles embedded therein. This tool is rotated in mesh with the gear to be finished. The tool may consist of a steel or cast iron core to which a coating is applied of glass fibre reinforced plastic material, or it may be made wholly of plastics (epoxy, phenolic, polyester resin, or polychloro-trifluoro-ethylene), in both cases using particles of 40-120 mesh silicon carbide as the abrasive. (14 claims, 6 illustr). *J* *C 13.01*

USP 2,830,634 **M. Pollmann, Kurt Korber & Co KG**
(Dec 19, 1952—conv date, Germany)

Adjusting device for sharpener for tobacco cutter

Adjustable diamonds are arranged on the roller bearing supports in front of the end of the cutter drum at the level of the cutter knife edges. The point adjustment determines the spacing of the cutter knives from the counter edge on the under jaw of the mouthpiece. The feed of the two grinding wheels for sharpening the knife edges is also determined by this adjustment of the diamonds which serve as truing tools. Fig 9 shows diamond 10 and a grinding wheel on slide 12

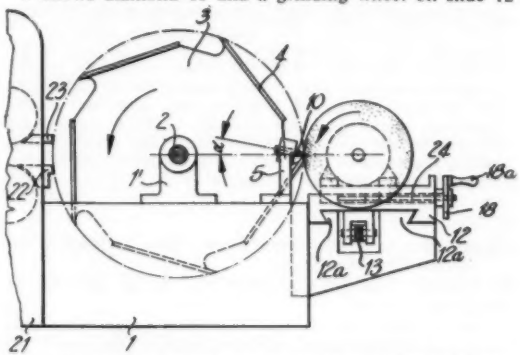


Fig 9. A view of the device in position. USP 2,830,634.

reciprocated parallel to the drum axis 2 by crank drive 13. The forward knife edges of cutter knives 4 are preferably kept at a distance of 0.05 mm from the counterknife edge 22 on mouthpiece 23. (1 claim, 3 illustr). Ref cited: 4 USP; see also BP 573,416.

J *C 5.01*

USP 2,831,296 (May 16, 1956) **E. L. Griggs, United Air Lines Inc**

Grinding apparatus

A rotatable grinding head for eccentric valve seat grinding is mounted on a pilot spindle. Spindle and head are axially movable independently, and resiliently urged together. The head may be used selectively either for concentric or eccentric operation. When grinding, the head rotates eccentrically about the grinding spindle, and the grinding surface of the wheel engages the valve face along a narrow line. For truing, the head is placed on a shaft with a special end portion to rotate about a single fixed axis. Crush truing is preferred. (14 claims, 7 illustr). Ref cited: 4 USP; 1 BP. *J* *C 5.01*

LITERATURE REQUESTS

When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

NEW MACHINING METHODS

Ultrasonic drilling machines. Ultraschall Bohrmaschinen
Anon. *Angewandte Chemie* 1958 Vol 70 (3) p 38 (Feb 17) (In German)

On account of their ferromagnetic properties, Ni-alloys can be successfully used for the manufacture of boring heads. A boron carbide water suspension serves as a grinding agent. This method produces a boring accuracy of 0.01 mm. *A* *C 12.9*

Copy grinding with abrasive belts
C. Adams & Co Ltd. *Engineer* 1958 Vol 206 (5352) pp 301-302 (Aug 22)

A new machine for grinding aerofoil forms on gas turbine and compressor blades employs the endless abrasive belt technique originated by Armstrong Siddeley Motors Ltd. The machine, which works on a system of 1 : 1 reproduction from a master form, is described in detail. 3 illustr. *W* *C 5.0*

Spot news—electronic drilling
Darmstaedter Hochschule, Germany. *Metalworking Prodn* 1958 Vol 102 (38) p 5 (Sep 19)

High accuracy holes of 0.003 in. diameter have been drilled in synthetic ruby and tool steels by directing a stream of electrons at a workpiece held in an electron microscope. *W* *C 12.9*

Information on the examination of cracks formed during work in spark erosion. Ein Beitrag zur Untersuchung des Bearbeitungsspaltes bei der Funkenerosion
K. Ganser. *Ind Anzeig* 1958 Vol 80 (79) pp 1206-1211 (Oct 3) (In German)

15 illustr, 8 ref. *A* *C 12.9*

Spark erosion grinding. Funkenerosives Schleifen
P. Kips. *Ind Anzeig* 1958 Vol 80 (79) pp 1211-1216 (Oct 3) (In German)

Details are given of the grinding process and of the machines used. A comparison is made between work-pieces machined by spark erosion and similar ones prepared by conventional methods. A piece of sintered carbide L2 was found to show distinct grooves after grinding with a diamond wheel (mesh size 30 microns), and single erosion pits of 10 microns diameter after spark erosion. The surface obtained in the latter case was an even one. In another instance, a bit made of sintered carbide L1 was ground by spark erosion, and its radius finished by a diamond grinding wheel. The radius showed more than twice the width of wear that the spark eroded part showed. However, as the tool was used for a longer time, the spark eroded part began to wear more quickly than the diamond ground radius. 24 illustr, 9 ref. *A* *C 12.9*

Cutting tools used in ultrasonic metal machining
V. V. Metelkin, I. V. Metelkin. *Maschinostroitel* 1958 (5) pp 35-38 (May) ; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1430 (Aug) (Original in Russian)
X *C 12.9*

Electrolytic grinding unlimited
E. W. Pennington. *Tooling & Prodn* 1958 Vol 24 (6) p 47 (Sep)

An appraisal of the present status of electrolytically assisted diamond grinding. *W* *C 12.9*

Reducing electrode wear in spark machining
W. Ullmann. *Metalworking Prodn* 1958 Vol 102 (37) pp 1608-1614 (Sep 12)

20 illustr. *X* *C 12.9*

Assessment of the work results of spark erosion machines. Die Erfassung des Arbeitsergebnisses von Funken-erosionsmaschinen
G. Stute. *Ind Anzeig* 1958 Vol 80 (79) pp 1201-1205 (Oct 3) (In German)

12 illustr, 4 ref. *A* *C 12.9*

Grinding hard metals with abrasives which are good conductors of electricity, using graphite as a filler. Le meulage des métaux durs avec des abrasifs conducteurs d'électricité en se servant de graphite comme matériau de remplissage
I. K. Trushin. *Vestnik Mash* 1957 Vol 37 (5) pp 59-61 ; *La Métallurgie* etc 1958 Vol 90 (6) p 505 (June) (In French, original in Russian)

Principles of electro-abrasion are recounted, and its use on sintered carbide described. The effectiveness of the process is described in comparison with diamond wheels with organic bonding, boron carbide wheels, electrolytic grinding by means of a metal wheel, and spark erosion. Working conditions, compositions of wheels, etc, are recommended, and other applications of the process suggested. *A* *C 12.9*

Electrolytic polishing of machine components
V. A. Zhikh. *Vestnik Mash* 1958 Vol 38 (6) p 58 ; *DSIR Transl Contents Lists Russ Period* 1958 (115) p 110 (Oct) (Original in Russian)
X *C 12.9*

Swiss P 328,830 (Mar 11, 1955) **H. Walti, Sicomatic AG**
Method for working surfaces and device for carrying out the method. Verfahren zur Oberflaechenbearbeitung und Vorrichtung zur Ausuebung des Verfahrens

The tool, which may be an abrasive tool or a filing tool, is attached to a vibrator, *eg* by an oscillatable spring biassed arm. It may be guided by moving a tracer along a design contour as shown in Swiss P 315,510. (6 claims, 3 illustr).
J *C 5.01*

POWDER TECHNOLOGY

Influence of additives on particle size of tungsten powder prepared by reduction with hydrogen from tungsten trioxide
H. L. Spier, W. L. Wanmaker. *Philips Res Rep* 1958 Vol 13 (2) pp 149-156 (Apr)

2 illustr, 12 ref, 6 tables. *W* *D 13.5*

TOOL PRODUCTION AND DIAMOND RECOVERY

Conference on problems in the design of high efficiency cutting tools and technology of their production
K. S. Degtyarenko. *Stanki i Instr* 1958 Vol 29 (6) p 45 ; *DSIR Transl Contents Lists Russ Period* 1958 (115) p 92 (Oct) (Original in Russian)
X *C 6.0*

Manufacturing cutting tools
V. M. D'iakonov. *Mashinostroitel* 1958 (4) pp 12-17 (Apr) ; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1494 (Aug) (Original in Russian)
X *C 12.0*

A rapid method of setting oriented diamonds in tools

R. G. Weavind, C. J. Guykers, A. R. Roy (Diamond Res Lab, Johannesburg). *ASTE Conf* 1958 Vol 58 Techn Paper (103), 4 pp

The orientation method is discussed briefly, and a detailed description is given of the transfer and mounting of the diamond in the tool shank. The orientated diamond is picked up by a shellac coated tool and placed horizontally along a v-block. The blank tool shank, having a quantity of paste in the recess facing the diamond, is placed along the opposite end of the v-block. The diamond is then pressed into the paste, heated to evaporate the solvent, and detached from the transfer holder by heating the shellac. The remainder of the cavity above the diamond is filled with a suitable brazing alloy. Infiltration of the metal powder bond and 'wetting' of the diamond is carried out in a dry argon atmosphere, and takes 5 min at approximately 1,000 deg Centigrade. Suitable bonding agents are recommended, and the equipment used in the process is illustrated. 6 illustr.

W *D 13.0*

SURFACE FINISH TESTING

Precision control of surface profiles by a roughness metre. Le controle précis des états de surface par le rugosimètre

Anon. *La Machine-Outil Franç* 1958 Vol 23 (136) pp 159, 161, 163, 165 (Oct) (In French)

The instrument described is a Philips type PR 9150, and includes a tracing stylus of sapphire with a spherical tip of 60 micron radius. 12 illustr.

A *C 3.22*

Precision vibrations, and smooth surface finishing in lathework

I. S. Amosov, V. A. Skragan. *Library of Congress Mthly Index Russ Access* 1985 Vol 11 (5) p 1287 (Aug) (Original in Russian)

Book, Gos nauchno-tekhn izd-vo mashinostroit lit-ry, Moscow. 1958, 88 pp. [Not in library of Ind Diamond Inf Bur].

X *C 6.0*

Surface finish—metallurgical and mechanical aspects

K. G. Lewis. *Met Treatment* etc 1958 Vol 25 (156) pp 377-384 (Sep)

The various expressions used in the study of surface finish are described, together with the more important machine and material variables which affect them. Particular attention is paid to chip formation and its influence on surface finish. The effect of metallographic structure is examined at length owing to its bearing on the formation of built-up edge. Investigations into the mechanism underlying the formation of 'smear metal' are described, and the various means for its removal compared, the comparison including an examination of the effect of cold-working on surface finish. 26 ref.

X *D 15.4*

MISCELLANEOUS

Carbide wear parts . . . reduce paper slitting costs

Anon. *Carbide Engg* 1958 Vol 10 (8) pp 18-19 (Aug)

The substitution of sintered carbide wear parts for steel in a paper slitting operation. Regrinding takes approximately 20 min, using a 6 in. diameter diamond wheel. 2 illustr.

W *C 12.21*

Proper treatment, care, and supervision of machine tools. Sachgemaesse Behandlung, Pflege und Ueberwachung der Werkzeugmaschinen

Anon. *Technica* 1958 Vol 7 (20 pp 1109-1114) (Sep 26) (In German)

The article covers all aspects of upkeep, from cleaning and oiling to the correct use of coolants. (To be concl). 19 illustr.

A *C 6.0*

The numerical control of machine tools

R. C. Brewer. *Engs Digest* 1958 Vol 19 (9) pp 373-400 (Sep)

50 illustr, 6 ref.

X *C 6.0*

Friction, wear, and lubrication in machinery

A. K. D'iachkov. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (5) p 1288 (Aug) (Original in Russian)

Book, izd-vo Akad nauk SSSR, Moscow. 1958, 157 pp. [Not in library of Ind Diamond Inf Bur].

X *C 2.23*

The design of automatic machine tools for electronic control

F. Koenigsberger. *Inst Prod Engs Journ* 1958 Vol 37 (10) pp 610-626 (Oct)

17 illustr, 5 ref.

W *C 6.0*

BP 798,818 (May 17, 1955) **D. G. Times, General Electric Co Ltd**

Apparatus for manufacturing synthetic jewels

BP 697,419 refers to an apparatus for making synthetic jewels in which a stream of gas carrying the constituent powder is split up on emerging from a primary duct so that it passes through at least two secondary ducts to a furnace chamber. In order to obtain greater uniformity in the jewels, the distributor for splitting up the gas stream includes passages to connect the primary duct with one of the secondary ducts, and means for moving the distributor intermittently from one to another of a series of positions for connecting the passages with all of the secondary ducts in turn. (5 claims, 2 illustr). Add BP 697,419.

J *C 2.01*

TRADE LITERATURE

Collected catalogues

Stadoil Mfg Co, El Monte, Calif.

The principal piece of literature is not a catalogue, but a reprint of an article by D. Kauffman, originally published in *Tool Engineer* 1952, entitled 'Wet grinding saves diamonds' [See *Bibl Ind Diamond Appl* 1953 Vol 10 p B32 (Jan)].

Attached to the reprint is a selection of explanatory literature dealing with Stadoil diamond lapping oil. Uses for which it is suitable and quantities in which it is available are given.

W *C 5.0 : C 13.2*

Let DTA diamond blades solve all your cutting problems

Diamond Tool Associates, 940 East El Segundo Boulevard, Hawthorne, Calif. 4 pp, 8½ × 11 in., illustr

Sixty three materials are listed—from agate to wall tile—and suitable diamond blades for cutting them are suggested. Each material has at least one recommended type of blade—one suitable for general cutting purposes, and some materials have additional types recommended which will provide either faster cutting with a small sacrifice in blade life, or long blade life with a small sacrifice in cutting speed. Some uses of DTA blades are illustrated.

W *C 8.0*

Facts and Figures : Nos 3 and 5
AIT Diamond Tool Co, 8221 North Kimball Ave, Skokie, Ill.

Details of several diamond wheels are given in the duplicated information sheets, including the D11B flared-cup wheel for dry grinding applications. It is said to require no dressing under normal conditions, thus permitting the whole of the diamond content to be expended on the actual grinding operations. Tests have shown that up to 40% of the diamond content is dressed away on other wheels.

A test report on the E-2, a diamond-impregnated wheel for electrolytic grinding, is included. All E-2 wheels are 'run-in' prior to sale, and operate immediately at top efficiency when used by the purchaser. Wheel life is improved by a factor greater than 2 in comparison with other wheels. *W D 8.0*

Black diamond drill grinders (Bulletin No 748)
Edward Blake Co, 437 Cherry St, West Newton 65, Mass. 4 pp, 9 × 11 in., illustr

Three models of the Black Diamond drill grinder are described, the principal difference in the models being in the capacity. Number 1 is for two-lipped drills of 60 wg to 11/32 in., No 2 is for two-lipped straight shank and No 1 Morse taper shank drills of $\frac{1}{2}$ to $\frac{1}{2}$ in., and No 3 is for two-lipped straight shank and No 1 and 2 Morse taper shank drills of $\frac{1}{4}$ to $\frac{1}{4}$ inch. Attachments are available which extend the range of these models. A cup type dry grinding wheel is provided, together with a diamond truing device mounted on a swinging lever. *W C 12.21*

Precision 'WW' lathes for watch- and instrument-makers
Boley & Leinen, Esslingen/Neckar, Germany. British rep : Southern Watch & Clock Supplies Ltd, Precista House, 48-52 High Street, Orpington, Kent. 8 pp, $8\frac{1}{4} \times 11\frac{1}{4}$ in., illustr

A catalogue showing a watchmakers' lathe and accessories, suitable for other precision machining. A full description of dimensions and capacities is given. *W D 10.0*

Collected catalogues [diamond drilling equipment]
Boyles Bros Drilling Co Ltd, Vancouver, Canada

The BBS-3 is a versatile 5,000 ft heavy duty diamond drilling machine suitable for rotary work, conventional diamond drilling, or wire line coring. It can be supplied with gas, diesel, or electric power. Bit load indicators and bit speed indicators are standard. The BBS-2 diamond drill is somewhat smaller ; it has an air-cooled petrol engine, and will produce a 15/16 in. core to 2,400 feet.

The Bazooka diamond drill is suitable for blast hole or core drilling ; a 0.735 in. core can be obtained to a depth of 300 feet. Powered by a 16 hp vane type air motor, it can be mounted in four different ways, each of which allows the machine to drill without being held by the operator.

The X-Ray surface (petrol engine powered) or underground (air powered) diamond drill is a light model for core or plug drilling where overburden is not a difficult problem. A $\frac{1}{2}$ in. core can be obtained down to 200 feet. *W C 9.21*

Collected catalogues [diamond drill bits]
Diamond Tool Research Co Inc, 380 Second Ave, New York 10, NY

Price lists and descriptive literature concerning diamond drilling tools are being constantly brought up-to-date by this company. The latest catalogues stress the economies that can be achieved by use of DTR products. *W C 9.21*

CORRIGENDA

See *Ind Diamond Abstr* 1958 Vol 15 p A70 (May)
The cutting of sheet glass
For 'G. Frikett' read 'G. Frikell'.

See *Ind Diamond Abstr* 1958 Vol 15 p A21 (Feb)
Shaped tools for form grinding from the manufacturers' viewpoint
For 'J. B. Spiers' read 'J. B. Speirs'.

PATENT LISTS

PATENT ENQUIRIES

Enquiries relating to entries in these lists of Patents should be addressed to Industrial Diamond Information Bureau, 2 Charterhouse Street, London EC 1.

BRITISH

The Official Journal (Patents) 1958 (3630) (Sep 10)

804,110 FREEMAN, H. K. Drilling bits.

803,887 WESTERN ELECTRIC CO INC. Methods and apparatus for the electrolytic shaping of electrically conductive bodies.

803,995 CINCINNATI MILLING MACHINE CO. Cutter grinder.

The Official Journal (Patents) 1958 (3631) (Sep 17)

804,376 FERRAND, M. Method of and apparatus for making abrasive tools.

804,406 GLEASON WORKS. Wheel dressing devices.

804,413 WATTS (SHEFFIELD & LONDON) LTD, J. Grinding wheel dressers.

UNITED STATES

Official Gazette 1958 Vol 733 (1-4) (Aug)

2,845,754 A. RIMOLDINI, DALMINE SpA. Apparatus for shaping the tips of machine tools.

2,845,756 F. PAPKE, VOIGTLAENDER AG. Profile projector or comparator for cutting machine tools.

2,845,921 J. LOECY, jun. Automatic device for dressing grinding wheels or the like.

2,845,922 A. T. KOHLSTRUNK, WHEEL TRUEING TOOL CO. Tool assembly.

2,846,065 J. M. ALEXANDER. Hardness gauge.

2,846,193 J. CHADDERDON. Milling cutter for use in oil wells.

2,846,826 H. C. MILLER, SUPER-CUT INC. Mounting and truing device for peripheral type circular grinding or cutting wheels.

2,846,869 V. M. TYLER, J. R. GRAY, H. I. SARGEANT, HUGHES AIRCRAFT CO. Shock impulse testing apparatus.

2,847,800 H. E. INGERSOLL. Automatic grinder for tungsten carbide drill bits.

2,847,801 J. SCINOBA. Glass grinding machine.

2,847,804 T. H. CALKINS, T. S. HOOD, CONTINENTAL OPTICAL CO INC. Method of making lenses.

2,848,848 E. M. HUTCHINS, WESTERN ELECTRIC CO INC. Cam grinding apparatus.

SOUTH AFRICAN

Official Journal 1958 Vol 11 (30-34) (July-Aug)

728/58 S. ENGWALL. Method in rock drilling.

788/58 F. J. O. W. OHLSSON, SANDVIKENS JERNVERKS AB. Cutting tool and sintered hard metal alloy.

1044/58 G. L. HAYWOOD, NORTON CO. Coated abrasives.

SWISS

Patentliste 1958 (14-15) (July-Aug)

331,447 W. ZAUGG, WERKSTAETTE UND WERKZEUGBAU. Hole finishing machine for watch jewels.

331,450 F. V. ATKESON, PITTSBURGH GLASS CO. Method of cutting a glass plate and apparatus for carrying out this method.

331,638 H. E. BALSIGER, LANDIS TOOL CO. Bearing with a one-piece annular sleeve.

331,918 E. W. DAWSON, CANADIAN PATENTS AND DEVELOPMENT LTD. Polishing machine.

FRENCH

Bulletin Officiel 1958 Vol 75 (3876-80) (Aug-Sep)

69,739 G. NAVARRO. Machine for sawing marble
1,134,196 or for similar applications.

GERMAN

Patentblatt 1958 Vol 78 (34-38) (Aug-Sep)

Applications Open to Public Inspection

1,037,150 E. FITZER, SIEMENS-PLANIAWERKE AG FUER KOHLEFABRIKATE. Method for producing molybdenum-silicon hard metal alloys which are easily finely ground.

1,037,307 C. G. EKHOLM, LIDKOEPINGS MEKANISKA VERKSTADS AB. Device for compensating play in the drive for the control wheel of centreless circular grinders.

1,037,310 J. HOULDSWORTH, A. A. JONES & SHIPMAN LTD. Tailstock for grinding machines.

1,037,350 W. BAUER, E. SINGER, SIEMENS-SCHUCKERTWERKE AG. Mehod of manufacturing bodies of sintered hard materials, in particular of cutting tools.

1,037,594 P. L. GUENTHER, G. ROSENBERGER, SIEMENS & HALSKE AG. Method for producing shaped bodies of germanium or silicon.

1,037,773 KAPELLA LTD. Precision spindle bearing.

1,037,806 W. DEMAND. Lathe tool.

1,037,808 T. B. PHILIP, DISTILLERS CO LTD. Coolant for cutting and chip producing tools.

1,037,818 SOC FINANCIERE D'EXPANSION COMMERCIALE ET INDUSTRIELLE SA (SFINDEX). Method of making pairs of bodies with engaging surfaces.

1,037,912 W. ECKERKUNST, VEB FEINMESS-WERKZEUGFABRIK SUHL. Measuring and stopping apparatus for circular grinding machines.

1,037,913 W. BAURHENNE, 'BI-FLEX' GmbH. Polishing, grinding, or contact disk, and method for its manufacture.

1,037,914 H. KRUG, DISKUS WERKE FRANKFURT a MAIN AG. Device for reasonably fixing grinding bodies with reinforcing ring to a supporting disk.

1,038,018 L. AAGAARD, TITANGESELLSCHAFT mbH. Method for obtaining basic materials for making titanium carbides, nitrides, or borides.

1,038,236 G. HARTMANN, F. ROHR, EMBA FABRIK ELEKTRO-MEDIZINISCHER UND DENTALER APPARATE. Dental drilling and grinding machine.

1,038,289 C. BALLHAUSEN, H. SCHOELKENS, DEUTSCHE EDELSTAHLWERKE AG. Sintered carbide.

1,038,297 H. -R. KUEHN, ELECTROACUSTIC GmbH. Sound pick-up for broad-band tracing of records.

1,038,433 N. JENIKOWSKY, H. G. LUX. Grinding
1,038,434 wheel.

1,038,435 W. OSENBERG. Grinding tool for working materials of high strength and hardness with hard material grinding rings concentrically arranged on a supporting disk.

1,038,765 AG FUER UNTERNEHMUNGEN DER EISEN- UND STAHLINDUSTRIE. Improvement of the oxidation resistance of sintered chromium-carbide—nickel sintered carbides.

1,038,875 M. B. MENTLEY, NATIONAL BROACH AND MACHINE CO. Device for grinding gear wheels with longitudinally curved teeth.

1,039,006 H. HUEGEL. Core catching device for deep drilling tools.

1,039,045 J. A. LELY, NV PHILIPS' GLOEILAMPENFABRIEKEN. Method of making silicon carbide crystals by sublimation.

1,039,345 J. L. MEIJERING, G. H. BROERS, NV PHILIPS' GLOEILAMPENFABRIEKEN. Method of machining porous tungsten with cutting tools.

1,039,398 K. H. SCHULTZE, O. JAECKEL, H. LINDNER GmbH. Feeding device for thread grinding machines.

1,039,436 E. BUSCH, MASCHINENFABRIK UND EISENGIESSEREI A. HEINEN. Cutting machine for tobacco or other vegetable materials with planetary movement of circular rotary cutters arranged on a rotary cutter carrier.

Patents Granted

970,280 E. LINDNER, H. MOEBIUS, K. MAECKER. Device on thread grinding machines for thread grinding machines for thread grinding by the plunge-cut method.

970,420 H. WELKER, SIEMENS-SCHUCKERTWERKE AG. Electric semiconductor device.

970,535 A. LIDEN, O. MALMBORG, SVENSKA DIAMANTBERGBORRNINGS AB. Method for setting or inserting diamonds or other hard grains in tools

970,565 A. MEUTSCH. Manufacture of rock drills or drill strings.

GENERAL NOTES

The Industrial Diamond Information Bureau is included in the Diamond Research Organization of Industrial Distributors (Sales) Ltd (incorporated in the Union of South Africa), together with the Diamond Research Laboratory in Johannesburg.

Abstracts

The Bureau prepares abstracts of current scientific and technical literature, including patents, on industrial diamonds and associated subjects. These are published monthly in *Industrial Diamond Abstracts*, which is supplied free to those concerned with the use of diamonds for industrial purposes, and to specialist libraries. The publishers do not claim any copyright in respect of abstracts in this journal. No specific acknowledgement is made to other abstract journals, and no objection will be made to other abstract journals using the contents.

The list of journals (latest issue, September 1955) from which *Industrial Diamond Abstracts* is compiled will be supplied on request.

Library

The Bureau has a Reference Library which seeks to cover world literature on the application and production of diamond tools. It is kept up to date by a careful examination of new publications announced in abstract and technical journals, and covers, in addition to English, German, French and Russian books. The library specializes in technical and scientific pamphlets.

Patent Abstracts

Patent lists are prepared from official patent journals of the major industrial countries, and patent abstracts in general from the printed patent specifications. Printed copies of British patent specifications accepted may be obtained from the Patent Office, Southampton Buildings, London WC 2, at 3s each. Numbers given under British applications for patents are for reference in all correspondence up to acceptance of the complete specification.

The following abbreviations are used :—BP for British Patent, USP for United States Patent, DAS for German Patent Application, DBP for German Patent (GP for German Patents issued prior to 1950), FP for French Patent, Canad P for Canadian Patent, and RP for Russian Patent.

Supply of Literature †

1. **Loan Service :** much of the literature abstracted in this journal is available in its original form, and can be borrowed for a period of fourteen days (in Great Britain only).

2. **Reprints :** copies of certain selected articles on industrial applications of diamond are available and can be supplied on request at a charge of 1s each, post free. New reprints are announced from time to time in this journal, and a classified list of reprints, dated September 1958, is available free on request.

Technical Information

The Bureau offers the resources of its considerable literature holdings to those seeking specific information on diamond tool and similar applications. Problems requiring fuller technical assistance can be referred to the Diamond Research Laboratory, Johannesburg.

Inquiries in connexion with these services should be made to Industrial Diamond Information Bureau, Industrial Distributors (Sales) Ltd, 2 Charterhouse Street, London EC 1.

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LIST OF PUBLICATIONS, NOVEMBER, 1958

***INDUSTRIAL DIAMOND ABSTRACTS:** issued monthly, from 1944 onwards, about 20 pp, 7⅜ x 9¾ in. Surveys technical, scientific, and patent literature.

***LIST OF PERIODICALS—BIBLIOGRAPHY OF INDUSTRIAL DIAMOND APPLICATIONS:** Alphabetical, 8 pp, 7⅜ x 9¾ in., Sep 1955.

***LIST OF PERIODICALS IN THE INDUSTRIAL DIAMOND INFORMATION BUREAU LIBRARY AT MAY 31, 1958:** Alphabetical, 8 pp, 7⅜ x 9¼ in. A list of periodicals available for loan from the Industrial Diamond Information Bureau Library. This does not replace *List of Periodicals* (above), which is a list of periodicals abstracted in *Industrial Diamond Abstracts*, many of which are not held by the Library.

***IDR REPRINT SERVICE :** Classified, authors' index, subject index of groups, 12 pp, 7⅜ x 9¾ in., Sep 1958. (Reprints 1s each, post free).

***THE DIAMOND RESEARCH LABORATORY:** 16 pp, illustr, 11 x 9 in. Rev ed, 1956.

SELECTED BIBLIOGRAPHIES:

* **Truing of grinding wheels** (from 1910 to 1951). 39 pp, 7⅜ x 9¾ in. 3rd rev ed, Feb 1952.

* **Diamond as cutting tool for metals and non-metallic materials.** 24 pp, 7⅜ x 9¾ in. 2nd rev ed, Nov 1950. Name index, 1951.

Hardness and hardness testing (from 1937 to 1955). 118 pp, name index, subject index, 7⅜ x 9¾ in. 1955-56. Price 5s 6d.

DIAMOND TOOL PATENTS (Patent Monographs)

IA: Machining metals and non-metallic substances, by P. Grodzinski, W. Jacobsohn. 2nd rev ed, 55 pp, 7⅜ x 9¾ in. Apr 1949. Price 10s.

II, IIs: Diamond abrasive wheels, by P. Grodzinski. 74 pp, 4 tables, name index, 7⅜ x 9¾ in. Aug 1948/49. Price 13s 6d.

III, IIIs: Truing of grinding wheels, by W. Jacobsohn. 133 pp, 82 illustr, name index, 7⅜ x 9¾ in. Dec 1948/49. Price £1.

IV: Polishing of gem diamonds, by W. Jacobsohn. 40 pp, 83 illustr, 1 table, name index, 7⅜ x 9¾ in. December, 1950. Price 12s 6d.

IA to IIIs available as compilation in Spirollo binding, price £2 9s.

THE PRINCIPLES AND DESIGN OF A NUCLEAR RADIATION COUNTER WHICH USES A DIAMOND AS ITS DETECTOR, by W. F. Cotty. 18 pp, illustr, 7⅜ x 9¾ in. Oct 1956. Price 2s 6d.

DATA SHEETS FOR THE DIAMOND TOOL DESIGNER AND MAKER—Definition and designation of angles: Comparison of names for tool angles: Plane of chip flow: Clearance and rake angles: Minimum clearance for diamond boring tools: Economic layout of tool tips: Height position of turning tools: Accepted standards. 1945, reprinted Oct 1956. Price 5s.

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* *Publication free of charge.*